ROAD and TRACK

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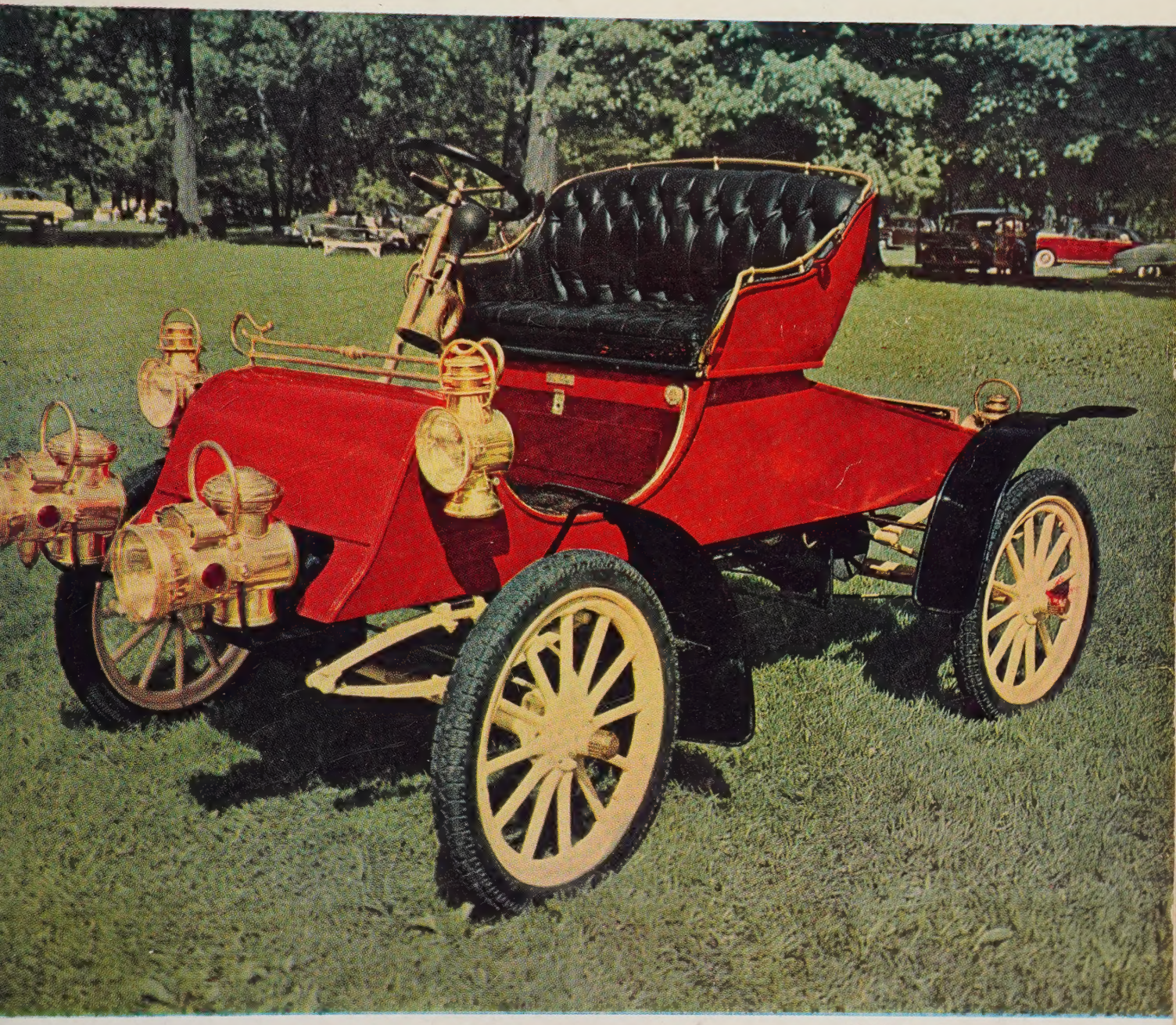
Vol. 2, no. 7

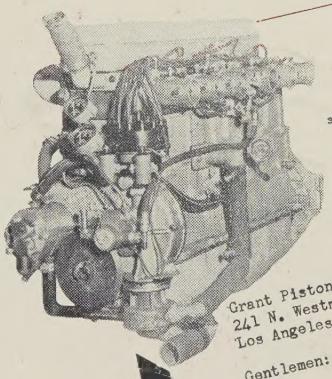
BRUARY, 1951



1903 Ford -- See Page 6

The Motor Enthusiasts' Magazine

Dynamometer Tests Show Terrific Power Combination Using Grant Piston Rings



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COMPETITION OHV ENGINES
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CLEVELAND 7-3314

November 10, 1950

Grant Piston Rings,
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Los Angeles, Calif.

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In recent tests, one of my modified G.M.C. truck engines produced 285 h.p. on a Clayton Dynamometer; being approximately 165 h.p. higher than factory rating of this type engine.

Several engineering changes were made on the engine, including the installation of Grant Piston Rings. Your rings were selected after others failed in giving me the results I felt the engine capable of delivering.

Grants produced and held maximum power; also gave excellent oil control throughout.

Based upon experience in my test program I recommend Grants.

Sincerely yours,

Wayne F. Horning

Wayne F. Horning

Mr. Horning used for this test, besides Grant Piston Rings, the Hilborn-Travers Fuel Injector, Herbert Cam, Spaulding Ignition and the Wayne F. Horning Competition Head.

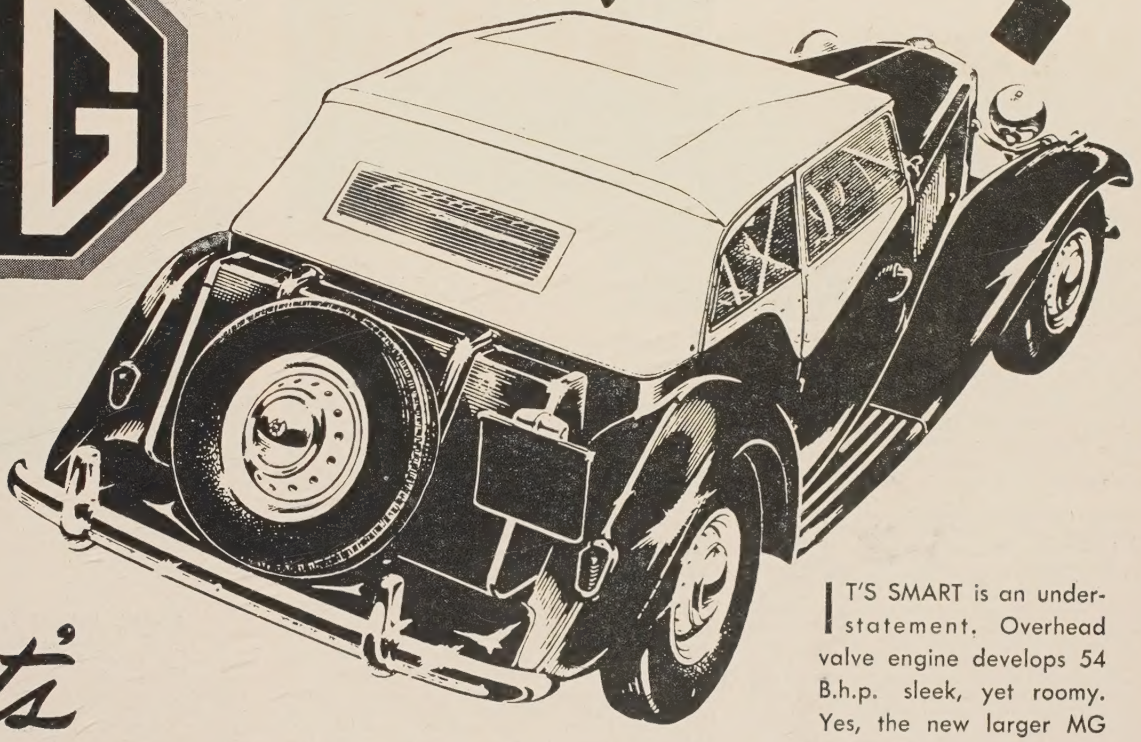
Write for Gerry Grant's FREE Catalog and name of nearest Grant Dealer. Dealership particulars given when requested on your letterhead. . . . . Be a winner with Grant!

Grant
PISTON RINGS

241 N. Westmoreland Ave., Los Angeles 4, California

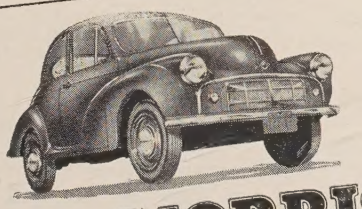
Going places

MG



It's Safety fast!

IT'S SMART is an understatement. Overhead valve engine develops 54 B.h.p. sleek, yet roomy. Yes, the new larger MG series TD is *going places*. Of course, you'll want to go along! $1850.00 F. O. B., U. S. Ports.



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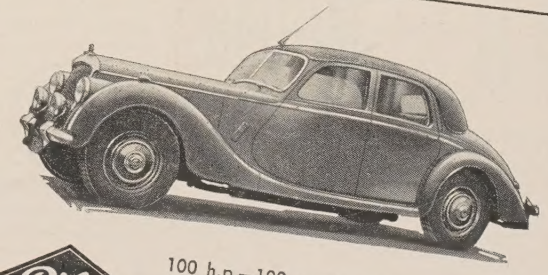
Convertible or Sedan. Has the advanced features of the big modern cars, with amazing small car economy and convenience. Seats four in comfort. High efficiency engine — 35 to 40 miles per gallon. Easier to steer through traffic — easier to park. $1295.00 F. O. B., U. S. Ports.



Riley

100 h.p.—100 m.p.h. Sedan model has 2½ litre engine. Speed with comfort and safety. Torsionic front wheel suspension. Hemispherical cylinder head. Air-flow body styling.

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CORRESPONDENCE

$5700 KAISER?

Your readers may be interested in the fact that current issues of English automotive magazines such as "Autocar" and "Motor" carry advertisements which offer a practical expression of the English evaluation of American cars:

For example, the following are offered as extraordinary values:

1950 Kaiser — $5700
1947 Olds — $4400
1939 Buick — $2100
1939 Chevy — $1150
1949 Dodge — $2700

Compare this with:

1939 Mercedes, — $5700
1949 Jaguar — $3400

Bugatti's and Alfa's are offered at around $1500-$2000.

In view of allegedly poor road-holding qualities and gas economy of American cars, these prices are a little surprising in a country of winding roads and high gasoline prices, and American cars actually sell at these prices, as any of us who have been over recently can testify.

All this may mean that a foreign car buyer in the United States (or in England for that matter) may be intrigued by a novelty in body design or just desires to be different—but not necessarily better.

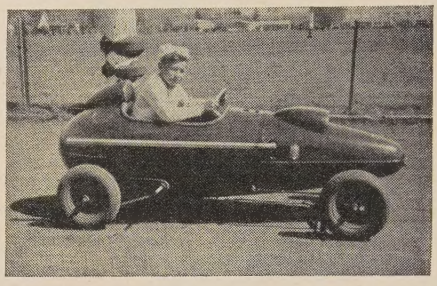
Anyway, I thought that you would be interested in seeing evidence of a practical expression of how our cars look to them.

Montclair, N. J. George Chernowitz

Reader Chernowitz forgets that importation of American cars to Britain is banned and almost all British cars are exported. Therefore, the few American cars that are "available" are sold at premium prices solely on the basis of their large size and carrying capacity. Were this not true, an enterprising used-car dealer could make a fortune shipping cars over there to sell at these fantastic prices. Detroit engineers are the first to admit the technical superiority of such cars as Jaguar, Mercedes, Rolls-Royce and Alfa-Romeo, but point out that to build such highly specialized designs in mass production and try to sell them here in America would be extremely difficult. For dependable transportation at a nominal first cost, American products are by far the best.—Ed.

MICRO-MIDGET

In the December issue of Road and Track the article on the 500 Club caught my eye as I have a little Micro-Midget whose picture is enclosed.



I approve very much of your 500 Club, and agree with other readers . . . omit the cycles and boats, just leave the book for cars of any style.

Chico, Calif. Jim Benton

JOURNALISTIC GENIUS?

I wish to congratulate you on your superb accounting of the Watkins Glen road race and also of the Carrell Speedway race in your December issue of Road & Track. They are so comprehensive in every detail that I feel as if I had seen them in person. Both articles show a touch of journalistic genius. In view of the fact that you charge such an exorbitant price for each issue, it seems that you could afford articles superior to these, which were so obviously written by someone no more than ten years old.

I also found a scrambled mass of wasted space appropriately called Misc. Ramblings. This was a true literary masterpiece. If I were the editor I would go a few steps farther and rename the whole magazine Misc. Ramblings.

I shall treasure this issue of what is optimistically called the Motor Enthusiasts Magazine and I will file it with my collection of other similarly great publications; **under my motorcycle to catch oil drippings.**

With Complete Disgust,
Inglewood, Calif. Leonard W. Team

The bold type is ours—Ed.

NOT F.O.B. DETROIT

. . . Here's an addition for your list: Colby, 1916, Mason City, Iowa. (Its nameplate is in one of Clymer's books.)

Mason City, Iowa David M. Murphy

"F" HEAD FOR PRE-'50 WILLYS

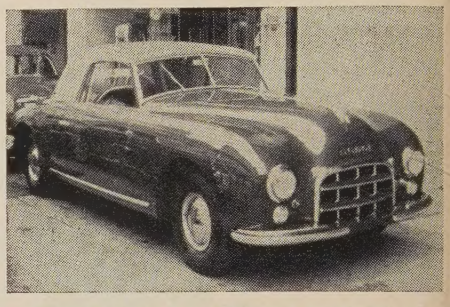
This bit of info is for your files, it might come in handy. If anyone wants to put an "F" head on an old Willys, they can modernize the old form with the new head provided it is a model 4-63 engine. Kits are available for the changeover.

Inquiries can be addressed to: A. Schulze, ServiceManager, Willys-Overland, West Coast Div., Box 3308, Terminal Annex, Los Angeles 54, California.

Norwalk, Calif. C. J. Galligher

SWISS DODGE

In your January issue I noticed a fine example of Italian coachwork on a Plymouth.



I am enclosing a photo of a 1950 Dodge which I took in Zurich recently. This shows what the Swiss can do to an American car. Perhaps some reader can identify the builder.

Springfield, Mass. R. N. Tuthill

READER WANTS MORE RALLIES

. . . Why don't you play up reliability runs and trials more? Here is part of the motoring competition that everyone can participate in, sports car or not. It places demands upon the vehicle to be **a good car** in all respects: safety, speed, reliability, comfort, etc. More people could participate with their regular cars and we should be able to promote sportsmanlike driving thru the interest in the runs and trials. Small organization is needed and the emphasis is upon participation. This may also be good groundwork for future international meetings. Best of all, it allows and encourages American cars (whatever their many faults) to enter. Certainly we are passing up many potential motor sport enthusiasts by catering to the predominately foreign car crowd. Trials require good sound preparation and a pride in one's car. Shouldn't this be stressed with owners of American cars too? When we have interest in cars by motorists who want to do more than just use it for transportation, we may come a good deal closer to the dream of an American sports car. What say?

San Francisco, Calif. Don L. Jewett

A very good idea—we agree wholeheartedly.—Ed.

Underseat Recirculating
HEATERS
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XK-120
Outlets under both seats.—Save space.
Full price $49.63
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THE BIGELOW GIMMY PRODUCES 248 HORSEPOWER AT 4850 RPM

Equipped with the Iskenderian $40.00 rocker arm track grind cam Kenny Bigelow's hardy 270 GMC (bored to 300 cu. in.) produced these enviable results on the Tony Capana dynamometer. This engine installed in a 3200 pound 37 Chevrolet Coupe on its first two entries at the Santa Ana Acceleration Trials won the Coupe Trophy clocking 97.8 mph at the finish of ¼ mile, and has also clocked 133 mph in Dry Lakes competition. The above engine was built for a total cost of $350.00, which figures $1.40 per horsepower—an important feature to consider.

A special brochure prepared by Kenny Bigelow is available. It gives important facts on converting the GMC engine for racing or fast road car use. Be sure to ask for it when sending for our catalogue.

ISKENDERIAN RACING CAMS

SEND ONLY 25c FOR THE 1950 CATALOGUE & CALCULATOR
The most complete and informative booklet ever published on Racing Cams. Fully explained is "VALVE TIMING FOR MAXIMUM OUTPUT." Also gives speed hints on Ford and Chevrolet, applications and prices. Black cut-away illustration explaining the installation of the Iskenderian Mushroom Tappet V-8 Track Grind Cams, Engine Modifications and Dynamometer Results. Included with the booklet is "The Secret of Cooling the Ford V-8" and a wallet-size calculator for converting R.P.M. to M.P.H.

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270 HORSEPOWER *from* FORD V-8 ENGINE

On a recent test a 196 cu. in. Ford V-8 engine, running Ardun Heads, Howard Fuel Injection and a Howard Cam, produced 270 hp at 5000 rpm.

Howard cams are guaranteed to out-perform the cam you are now using or your money back

This offer applys to any Ford or Mercury grind and the Chevrolet ¾ grind, Mushroom or standard tappet cams—you must be satisfied or the purchase price will be refunded.

M-3 ¾ grind—Ford V-8—Merc. $37.50 new $30.00 ex.
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SEND FOR THE INFORMATIVE NEW SPEED AND POWER DIGEST — ONLY 25c

Howard's 10122-R South Main St. Los Angeles 3, Calif.

CORRESPONDENCE

ANTIQUE FAN

The veteran car section is what fascinates me since I, to the limit of my small resources, collect interesting makes, also pictures of them.

I am writing now about the December issue. On "Not F.O.B. Detroit," I want to offer some corrections. You may be aware but anyhow—The DuPont was made in 1933; The Bour-Davis thru 1924; The Dagmar to 1926 at least, and I believe later; The Lone Star thru 1922; The Kline Kar thru 1923; all this is from replacement parts directories, which are not infallible; also Motor Record.

The Maxwell was built in Rhode Island, once also a car called the Sun—so I'm told.

New York, N. Y. R. L. Porter

OLDS 88 BEATS HENRY J

I am the proud owner of an Olds 88 and have never been beaten in an acceleration race. I raced a Henry J (6), driven by a salesman of Henry Js. He pulled up beside of me and said he could beat me on the 'get'. I asked him to show me, which he tried four times and he was left behind all four times. The friends of Mr. Clymer must have been dear friends that didn't want to see him lose.

I am sure an Olds will beat a Henry J in any gear or race, including reverse. If any Henry J owners want a demonstration (in the Washington, D. C. area), call Robert F. Scott, ME-8868.

Washington, D. C. Robert F. Scott

Clymer says, "Call me up if you ever visit California!"—Ed.

ROAD RACING TOO TAME?

. . . Now concerning an article which expressed in words what many others have hinted, you stated that in no case would a Formula 3 race car be equipped with crash or nerfing bars, no such driving as to make them necessary was tolerated, etc. The only road race I ever saw was the Santa Ana Race, which I'm sure wasn't typical. The Carrell Road Race should have been something to see. I could see no connection between what was held at Santa Ana and a race, altho it did meet the 'no nerfing' rule . . . At Santa Ana I saw the cars with the most 'drag' and top speed win the races, that was all . . . Maybe on dirt the best of them would have acted differently, but on hard surface 'crossing up' meant only the quickest way of getting out of a slide, to most of the drivers, instead of a controlled way of getting around the corner without loss of speed—or won't the sport jobs cross up on asphalt? The Baldwin and its driver was the one exception.

With many new rules being made to better road racing, I'd like to be admitted to the sport, for even tho my ideas don't all agree, I like the cars and the people concerned. I have a sport job in the making.

Coronado, Calif. Lee Talbot

See article on p. 14 for reasons why some drivers don't "cross-up" when cornering. Santa Ana was NOT typical.—Ed.

MAGIC PHOTOGRAPHER

In regard to the story on the Story Sports Car, you state that the author is in the car on the cover, yet directly below that you state "All photos by Hegge". Is this Bob Hegge a magician, maybe?

Fairborn, Ohio Arthur Davis, Jr.

An automatic timer performs the magic.—Ed.

SPORTS CAR FORMULA

Your editorial concerning a "formula for sports cars" is well taken. You'd better follow it up with even stronger ones, in my humble estimation, because you have already gotten "to the point where a line of demarkation must be drawn." As I see it, it's once more a matter of the "letter of the law vs. the spirit of the law."

Los Angeles, Calif. D. P. Beaver

OMISSION—

On page 14, credit should have been given to the "Sports Car," official publication of the Sports Car Club of America, for permission to reprint the article, "How to Drive" by Grampaw Throttlebottom. The cooperation of that excellent organization is sincerely appreciated and the omission was unintentional.

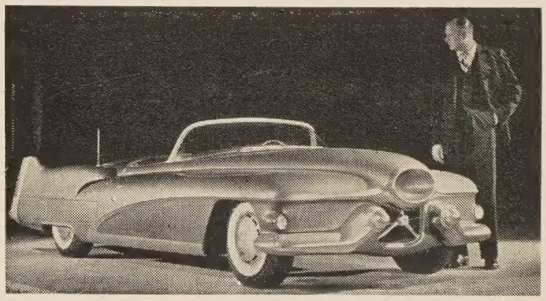
ROAD and TRACK

The Motor Enthusiasts' Magazine

LE SABRE

Is it really

a Sports Car?



Newspapers and magazines are currently drooling over GM's experimental "Le Sabre," glowingly termed a "sports car." It definitely is not, of course. It is significant, however, that General Motors has actually built a prototype which has many outstanding features and *could* become the basis of ONE OF THE WORLD'S BEST sports cars. Shorten the wheelbase to 100 inches, properly balance, use sports car steering ratios, clean up the styling, eliminate gadgets, and here could be a true sports car.

The blown experimental Buick engine, if it comes near to the 300 bhp predicted, would be more than adequate. Extensive use of magnesium and aluminum is highly desirable. The 4-wheel independent suspension sounds excellent.

Yes, Mr. Earl, it is a beautiful car, but how about another prototype, modified as outlined above, to enter at Le Mans this year. (Prototypes *are* eligible.)

INDIANAPOLIS—1951

Entry blanks for this year's race have been mailed, and include only slight changes in regulations. The overall length and width of cars has been limited, to keep out any freak designs. Two cycle diesels will now be permitted the same displacement as four cycle diesels.

Significant news has reached us from abroad, that European participation is assured this year. Certain are two entries by Ferrari, and two by Maserati. Probable are three entries by Mercedes. The latter are the 1939 three litre, two stage blown G.P. cars and have been driven in tests by Lang, Caracciola, and Kling. They were tentatively scheduled to go to Argentina for the winter season; however, it appears that they will not go, due to disagreement over arrangements.

Better order your tickets now, if you want to see the fastest Indianapolis "500" ever!

February, 1951 **Vol. 2 No. 7**

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PEBBLE BEACH and BUST!

The author, as a pit crew member on MG No. 77 at Pebble Beach, tells of the difficulties in preparing the car.

by C. Allen Yeagle

It all began the first week in October when Pete dropped over one evening madly waving a Pebble Beach entry blank in my face. "We're going to Pebble Beach, and you're elected Pit Crew." What a silly thing to say . . . for I'm a far cry from a mechanic. I gladly accepted; it was my first chance to get into a truly competitive event, and I would have given my wife's right arm to go.

The first few weeks were highly uneventful, and it seemed as tho we had all the time in the world. I took the MG head to Smith and Jones to be reworked, went back six times before it was ready, and wore a groove in Western Avenue between our garage and International Motors getting parts.

Electronic Balancing, while doing an excellent job on the rods and pistons made the mistake of removing the lock screw from the wrist pins thereby breaking one piston. The replacement came back from being balanced with a solid pin wedged into the hollow wrist pin . . . a balancing procedure which caused us considerable consternation. These little details, plus having the crank ground to ten under, took up time which was still passing slowly.

The race was only a week away and suddenly we had our first nightmare—but not our last. Before grinding the crank, we obtained the assurance of the local parts house that an ample supply of bearing inserts was currently available. When we went to get the inserts, however, the picture had changed and we could only buy two of the four sets we needed. We sweated as we drove to another agency, which, fortunately, did have enough for us to finish the job.

By now it was apparent that the car would not be assembled in time to be broken in before the race. Pete planned to take a day off work so that he could drive it thru. What a joke that was to be. Anyway, we scrapped the two half-built tow-bars we had welded up, wrote ahead for motel reservations, and definitely decided to leave Friday morning. Driving to Monterey at 35 mph would give us about 350 miles, not really enough for a tight engine, but the best we could do now that it was so late. Then, just as Pete was planning his available time down to a split second, he was called upon to work overtime every day at his job, and time to spend on the MG became very precious indeed. On the Wednesday before the race, he was still putting things together, and realizing that he would not be able to take Friday off, told me that I could drive the MG thru while he and Andy would follow later in my Mercury. It was a good idea —if it had worked.

I went into L. A. Friday morning with my bag all packed, some decent clothes on, and roaring to go. Pete and Andy were in the garage with such items as the radiator, generator, carburetors, and spark plugs lying around. Even the seats were sitting—on the garage floor. 'Seems that it takes longer to button-up than was anticipated. Oh well, I thought, it should be ready to go before Pete goes to work at 2:30. But it wasn't, cause when we did get it assembled and tried to start it, nothing budged. We tried the starter—plink! We towed it —screech! Andy went off to work. Then Pete had another one of his brainstorms—he decided to insert the crank and then jump on it, hoping that he could thusly turn the engine over. This was a sad mistake because it involved the weakest point on this particular sporting machine. The dog nut broke off in the crankshaft, and as it fell to the ground, Pete told me to wire Pebble Beach that we could not get there. "Maybe we can get our entry fee back," he said, trying to console himself. It was now past time for Pete to go to work so he dejectedly got up and started to walk off.

This stuff about hope springing eternal —which must keep Hope jumping all the time—popped up in Pete's mind and as he got into his car he yelled at me to dash out to International Motors for another dog nut. I could tear the radiator off and when he got home he would try to produce an easy-out out of nowhere or somewhere, I forget which. It was a long and a desperate maneuver, but after all the plans, visions, and hopes we had had, we would try anything. We did have until noon Sunday to get there, we joked. Luck rode with us that afternoon for I got the nut, returned, removed the radiator, and out of curiosity, started tapping on the broken cap screw with a punch and hammer. One of those inexplicables happened—the dog nut, which ordinarily would be in tighter than a Scotsman's wallet, came right out.

It still left us with the problem of breaking the engine loose and in order to do that we intended to put a couple of tool boxes in the rear of the MG and try towing it again. So, when Pete got home at midnight, we did just that and even with some five hundred pounds extra on the back wheels, we budged the engine not a degree. Pete, who has put together many an engine, had never cinched one down like this. We had tried everything.

"That fellow at International," Pete said, "swore that they ground crank to ten under and used R-1 bearings to fit."

"Pete," said I, "is there any chance that International was referring to some sort of a metric ten under while Crankshaft Grinding was using ten thousands of an inch?"

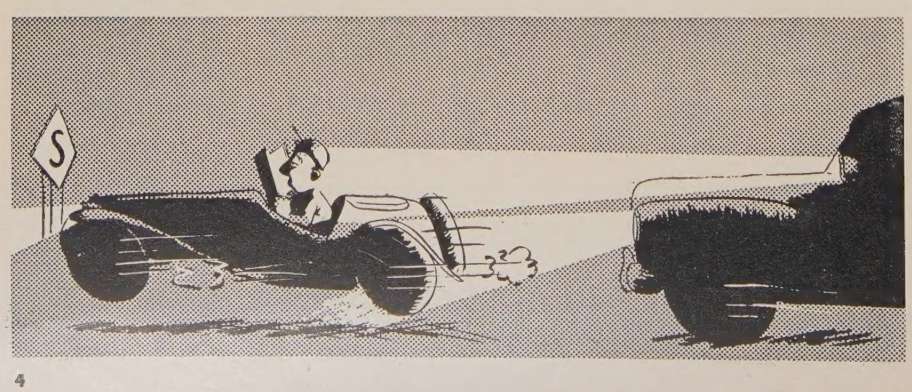
"Pull the pan! That must be it. We'll have the inserts sized out tomorrow." (We later found this to be the trouble, that is, the ten under referred to two different types of measurement.) So, at about one a.m. Saturday, morning practice runs began at Pebble Beach, we pulled all the inserts and knocked off for a few hours sleep. Little did we realize that this was the last time we would see a bed until late Monday.

The next morning, with twenty-five thousandths taken off the bearings, we put her back together knowing that she would either turn over or be loose as a goose. Fortunately, she just turned over, and hopeful souls that we were, we now thought our troubles were over. They were not; in fact, it seemed to be a continuous process of first one crisis after another.

The next order of business was to set the distributor and tune the carburetors—not much of a job, yet it took us from noon to five p.m. and still the car was not running smoothly. To save the battery, we towed it, stopping every block while Pete adjusted the distributor or tinkered with the pots. First we noticed that one air damper failed to work when tightened down. It was fixed. Then the car insisted on blowing back thru the carburetors which was not corrected until much later. Then and always it just plain did not get up revolutions as are required for racing.

By five o'clock we decided to start off anyway, hoping that the bugs would disappear as we went along. Driving at thirty-five, stopping every ten miles to make unsatisfactory adjustments, we reached a seventy-mile coffee stop by eight. Time not

". . . Pete, riding ahead in the MG, was trying to read the instruction manual as he drove at the snail pace of thirty-five. We threw the Mercury's spotlite on the book so that Pete would not have to strain his eyes too badly, and with this he found what he wanted."



only was catching up with us . . . it was passing us by at an alarming rate. And still the car did not settle down to the smooth running machine that Morris Garages intended it to be.

Back on the road again, feeling rather disheartened about the whole thing, Andy and I suddenly noticed that Pete, riding ahead in the MG, was trying to read the instruction manual as he drove at the snail pace of thirty-five. We threw the Mercury's spotlight on the book so that Pete would not have to strain his eyes too badly, and with this he found what he wanted. A minute later the MG cut sharply into a large truck station, Pete found the operator, and after a short conversation, drove up under a flood light at the back of the station. As we pulled alongside, he yelled, "Eureka" (a good California expression—it is the state motto) and then told us of the prize boner of the year. In replacing the timing chain, Pete had counted the number of links between the two marking points on the crankshaft gear and the camshaft gear and then had calmly put the chain on counting the same number of links . . . on the opposite side of the gears.

Do you know how much is involved in removing the timing chain from one of these mechanical masterpieces? It means taking off the radiator, pan, dog nut, and timing gear cover, and we did it in three hours complete, with the help of one flood light, two flashlights, and three flares. Sure enough, the timing chain was on backwards, and why the car ever ran is a mystery to all of us (we had advanced all of the plug wires one position). By three a.m., with the car ready to roll again and with some 250 miles to go, we realized that we no longer had time to drive at break-in speed. What was needed now was break-neck running. Pete took out like only an MG will, with Andy and me in hot pursuit in the Mercury. Now, we thought, our troubles are over, if only we can get to Pebble Beach in time for some practice laps.

With only a hundred miles of break-in driving on the rebuilt engine, I had mental motion pictures of expensive noise developing like rods thru the block, pistons thru the heads, etc., but to the credit of MGs I must say that the poor mistreated dog took the beating in its stride and is still running well.

Coming down off Questa Grade north of San Luis Obispo and tacking high, Pete went into a mild left corner when suddenly a huge column of smoke belched from the car. We were some thousand yards behind, and at first I thought the car was on fire. As Pete continued at a furious pace, we realized that something else caused the smoke, but what could it be? At a coffee stop a few miles on, Pete had the trouble resolved. When we had the head rebuilt we got a new valve cover gasket, but it was the type used under the cast aluminum valve covers and was not quite long enough for the steel type. Oil sloshed out on left turns, hit the push rod cover and the side of the block and vaporized. Had we known how much trouble that was going to cause us, we would probably have done something about it then, but—

Rushing into Monterey we got a motel, bathed, rested a minute, ate, and hurried out to the track, arriving there at one minute to noon. I had called the course from the motel and was told that we were scheduled to enter the first event . . . the first event began at noon. Fortunately, there was an hour delay which gave us time to change oil, drop the baffle from the muffler, give the SU carburetors a last minute adjustment, and sign the release to drive on the course.

"It means taking off the radiator, pan, dog nut, and timing gear cover, and we did it in three hours complete, with the help of one floodlight, two flashlights, and three flares."

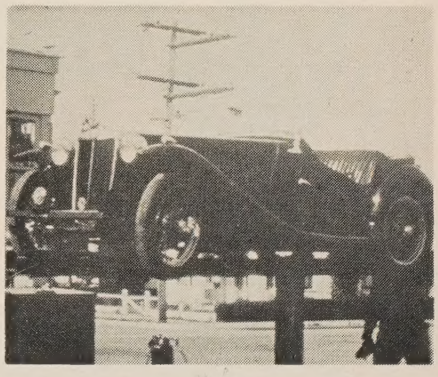
Then, of all things, the starter shorted out and running without a fan it made serious complications. Pete was in last position since we had not been present for the drawing of positions. It wasn't a disadvantage for Pete knew he would have to follow the other cars around the track for the first lap to find out where to go before he could really get on it. He had no time at all to memorize the turns . . . he would just have to guess at them and keep his fingers crossed. Shut-off points were something he would have to pick up as he went along.

Andy and I stood in the pits nervously crossing and uncrossing our fingers as the starter dillied and dallied, introducing each of the drivers to the crowd. Pete, meanwhile, would let the MG roll backwards down the slope from the starting line and then drive forward, attempting to blow a little air over the engine. As it was, the car started the race boiling, but had cooled down by the end of the first lap. We had tried to get the officials to permit a push to start, but it was no go. Yet there was one small consolation—the race was being run European style, that is, clockwise so that all the turns were to the right, and the car did not spew oil on right turns. Now I was having visions of how Ted Horn once raced on an unfamiliar track and won. But could Pete do it? He is not Ted Horn, that is for sure.

To make this a truly interesting story, I should be able to relate that Pete went on to win, but Lady Luck, the fickle little girl, deserted us before such could happen. Just before the starting point there was a slight bend to the left and sure enough Pete sent out volumes of vaporized oil all whiffing up onto the starter. On the sixth lap we were flagged off the circuit. Thus ended Pebble Beach, for us, that is—or that was.

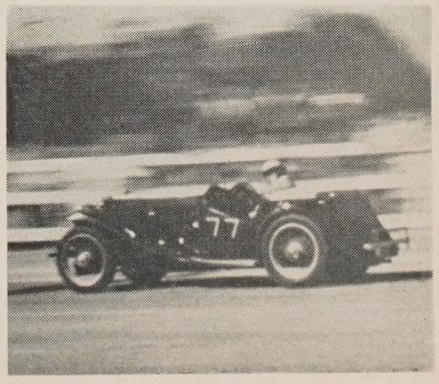
The moral of this story is: Unless you are fool enough to enjoy working a month to run six laps of a twelve lap race, stick to something simple like chess and do not go into competition racing. Me? When is the Palm Springs Road Race?

Ed. Note—A complete account of the Pebble Beach Road Race was carried in the January issue. Winner of the final race was Phil Hill in a Jaguar XK-120.



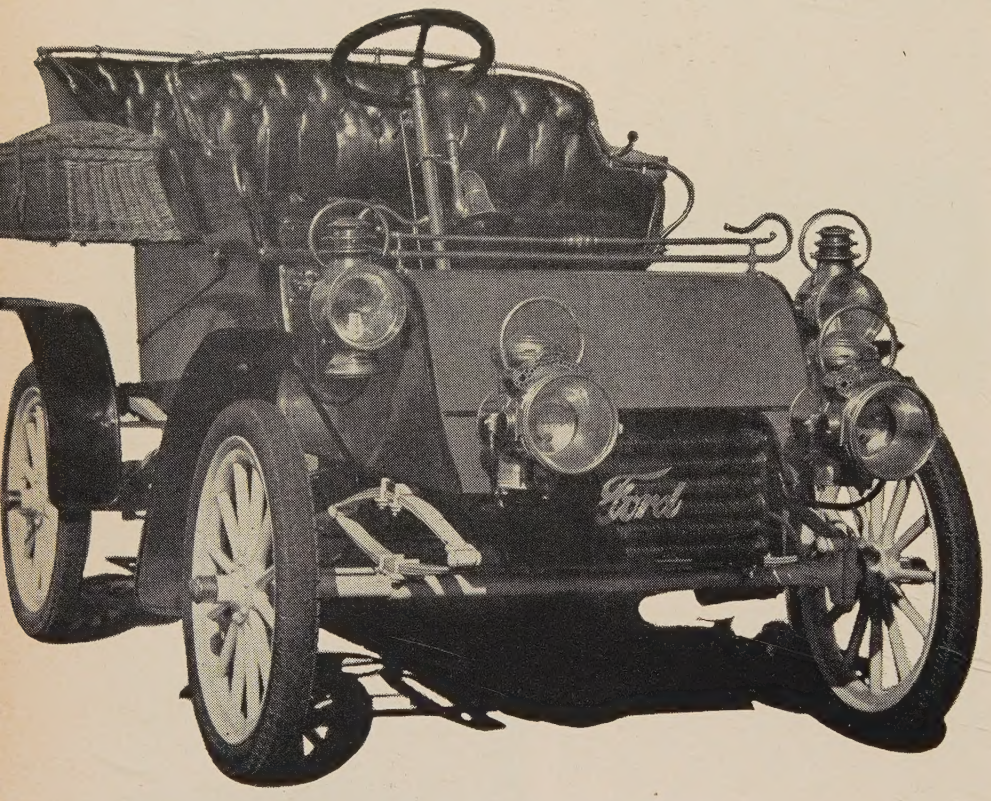
Time to start the first event . . . the MG is high on a grease rack. An hour delay in starting the race gave us time to get in.

We made it! But Pete was flagged off the course on the sixth lap for throwing oil.



ANTIQUE AND VETERAN

by W. Everett Miller



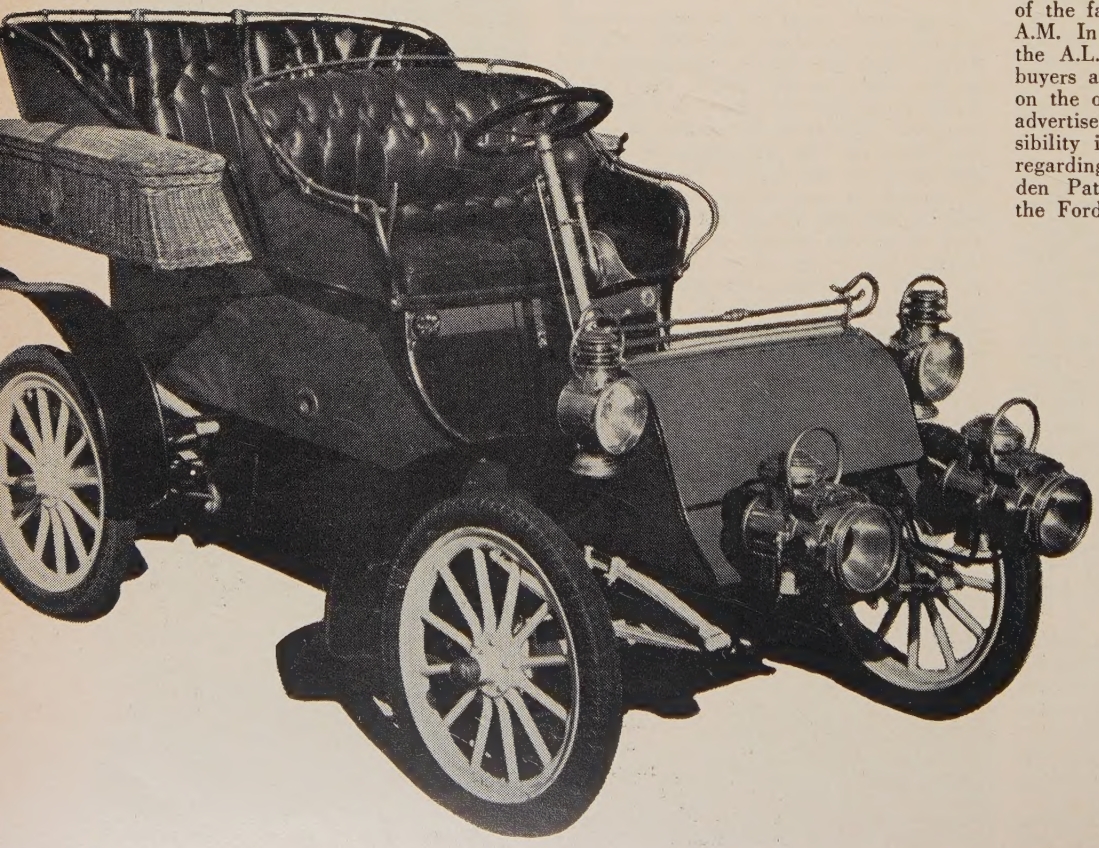
1903 FORD

The model "A" FORDMOBILE, as it was called in the first advertisement, when the car was announced in July 1903, was the first product of the newly formed Ford Motor Co., altho three very different models had been hand-built by Henry Ford in his seven years of experimenting. 195 cars were produced in the last half of 1903 and 1513 "A"s in 1904. With the detachable rear entrance tonneau it sold for $850, the same price as the single cylinder Cadillac which it resembled externally and which preceded the Ford by one year. This original model "A" Ford, however, boasted a horizontally opposed two cylinder, eight hp engine that advertisements claimed "eliminates the vibration so noticeable in other machines." Wait a minute—don't laugh! If you are fortunate enough to have a ride in one of these cars today you will find the engine as smooth as plate glass.

The five-gallon gasoline tank gave the car a cruising range of 100 miles and top speed was 30 mph. With four passengers and 1250 lbs. of automobile its power to weight ratio was 231 lbs. per horsepower. No wonder that so much interest was manifested in hill climbing in the early days. From a cost of $1.47 per pound for this car, Ford's price descended to 17 cents per pound in 1926, an all-time record.

Two sets of dry cell batteries powered the ignition, and the planetary two speed transmission, made famous by the model T, was introduced on the 1903 "A". A single chain drove the rear axle.

It was this model that spelled the doom of the famous Selden patent and the A.L.A.M. In the March 1904 *Century Magazine* the A.L.A.M. sounded a stern warning to buyers and makers of unlicensed cars, and on the other side of the page Henry Ford advertised "We agree to assume all responsibility in any action the Trust may take regarding alleged infringement of the Selden Patent to prevent you from buying the Ford—The Car of Satisfaction!"



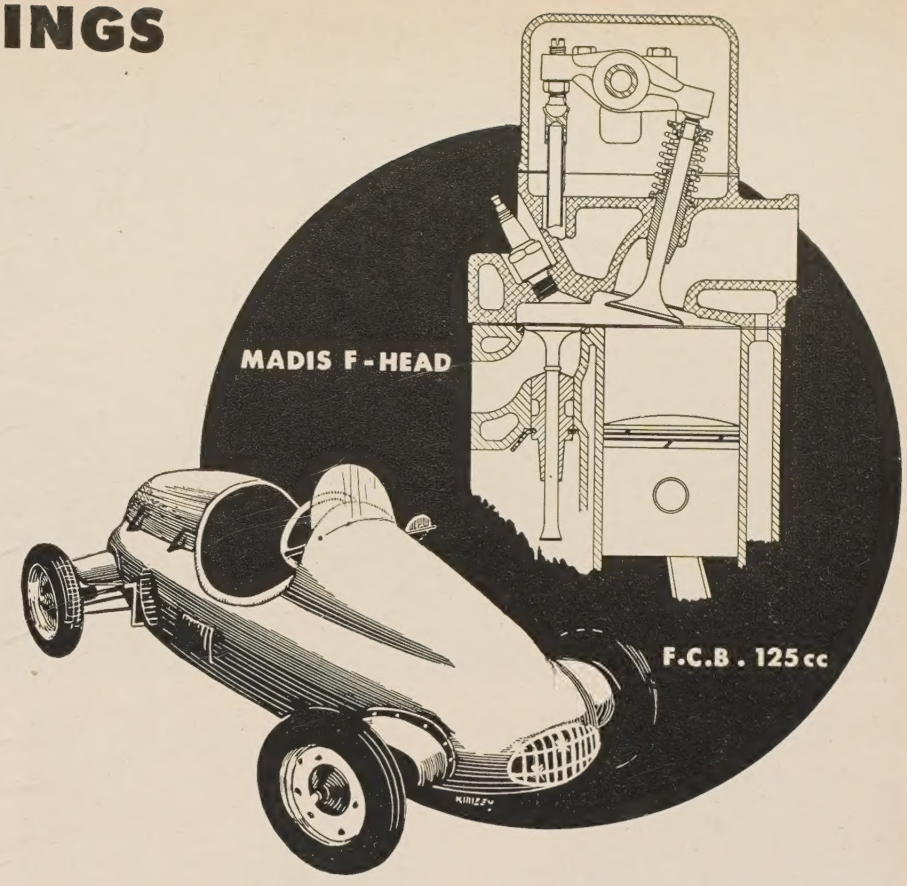
COVER PHOTO

The 1903 Model A Ford pictured on this month's cover belongs to Dick Teague, an industrial designer, living in Los Angeles. He purchased the car from Walter Levino of Peekskill, N. Y., in unrestored condition. Original owner of the car was a blacksmith in Tarrytown, N. Y., who had stored the car until recently, when car collector Levino obtained it. It took one year of work on the part of Teague to restore the car to its present condition. Practically everything on the car is original, except the tires, baskets and rear seat upholstery. The front seat upholstery is the original leather.

COVER PHOTO BY AL PHILLIPS

BLACK AND WHITE PHOTOS BY JACK CAMPBELL

MISC. RAMBLINGS by the TECH. ED.



Culminating many years of intensive design and development work, automatic transmissions are now available on virtually every American make. Whether this situation is good or bad remains to be seen. The enthusiast owner-driver will still prefer a good manually operated transmission, but such persons are claimed to be in the minority (I wonder?). After "sampling" most of these new automatic units, I feel that the "perfect transmission" is still a long way off. Aside from the high first cost, one should also consider cost of maintenance and upkeep. Do not be misled by the "simplicity" of a cross-section view. This does not begin to show the total complexity of an installation. Ask to see the hydraulic and/or electric circuit diagrams, or better yet, the special servicing manual.

The various new transmissions can be roughly segregated into 3 basic types. Group 1 is the 4-speed "step" type, cushioned by a fluid flywheel. Chrysler offers one example of this type—"Fluid Drive," which operates on the same principal as overdrive—(tho not automatic in the true sense). The well proven G.M. "Hydramatic," using a series of automatic planetary gears, is another. Group 2 is the 5-element torque converter favored by Chevrolet and Buick. Here, low efficiency tends to be offset by one-way clutches which virtually turn the converter into a fluid flywheel as higher speeds are reached. A 2-speed and reverse gearset is provided, primarily to meet certain state laws regarding hill descents. Group 3 transmissions are exemplified by Ford-Mercury and Studebaker which have simpler 3-element torque converters with 3-speed gearsets aft. I was disappointed with the "pick-up gear" feature of these two, it being similar to the kickdown of an overdrive with considerable lurch and bump.

In contrast to the above, I recently drove a Ford-Allard 4-seater, equipped with a 4-speed Cotal magnetically operated transmission. It is controlled by a small finger lever similar to the Bendix control of circa 1936 (used by Cord and Hudson). There is a conventional clutch and you can drive in an absolutely conventional manner, or you can ignore the clutch (once under way) whereupon the action is similar to a Hydramatic without the "matic"; i.e., you can shift up or down whenever you choose. I have always wondered how much trouble it would be to convert the Hydramatic to fingertip control. That would really be something worth while!

Watched a Cad-Allard have a go at the standing ¼ mile a few weeks ago—15.22 seconds . . . not quite equal to Roy Richter's Ford-Allard J-2 with small blower (14.79). Pay no attention to certain astounding ¼ mile times turned in by hot rods at the Santa Ana Blimp Base. They are not made from a standing start, but instead, a "rolling start" is used . . . which is useless for comparative purposes.

Speaking of fast take-offs, I recently drove a '34 Ford coupe powered with a Ford 6 engine equipped with the new Madis F-head. Had no opportunity to clock it, but I would say it can do the standing-start quarter-mile in 17 to 18 seconds, which is pretty terrific for a coupe. This new head is made of cast aluminum and the dual rockers operate 2-inch intake valves. Used on a stock engine, 125 bhp is claimed, which seems reasonable, and no doubt much higher outputs can be obtained using multiple carburetion, higher compression and a reground camshaft.

Crosley's new Super Sports Hot Shot, with 10 to 1 compression and water-alcohol injector as standard equipment, poses a neat problem for the Sports Car Club of America who, up to now, have not allowed such devices in competition.

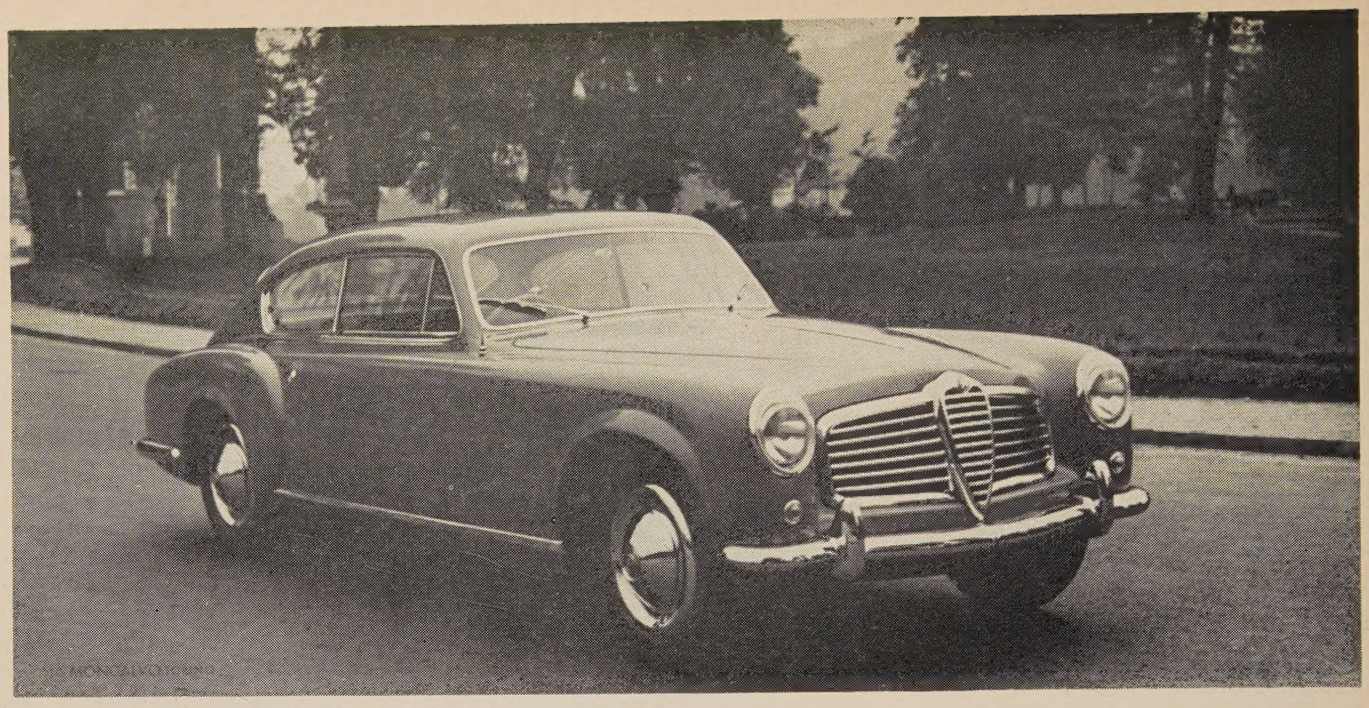
Several MG owners are talking about destroking enough to be under the 1100 cc class G limit, and then adding a supercharger . . . which puts them back in class F (1100 to 1500 cc) against their brother unblown cars. There are a few squawks about the regulations for the "little Le Mans" 6-hour race in Florida, mostly over the 2X displacement rule for blown cars. Personally, I think it's fair enough—at least for a trial. Incidentally, the formula used for determining handicap distance has one very bad loophole. I tried it for a 125 cc race car (such as the new Italian F.C.B., which sells for $680) and the formula distance comes out at 112.5 miles . . . a required minimum average speed of only 18.75 mph for the 6 hours! Should be a cinch to win if you didn't get run over.

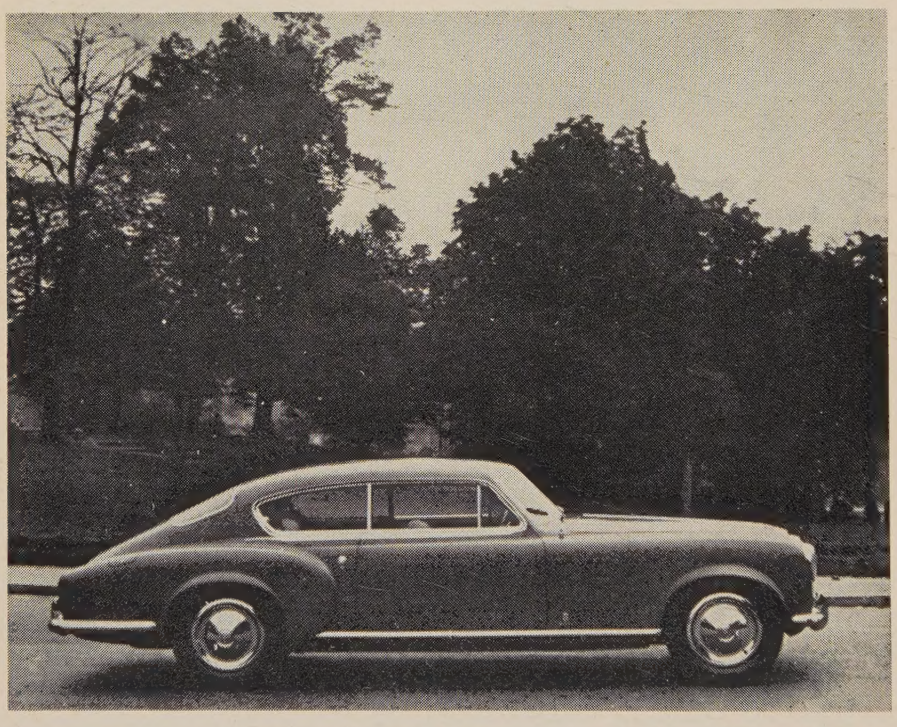
There seems to be a great deal of interest in developing the 750 cc class for racing—mostly because of the availability of the neat overhead cam Crosley engine. We know of three cars that are well along in construction, with several more contemplated.

The following table of engine weights has been compiled to help special builders. The figures are known to be accurate (except those marked * which are guesstimates) and include clutch, flywheel and all accessories such as fan, water pump, generator, starter, carburetor, fuel pump, etc. The second row of weight figures include transmission, as explained in the last column.

TABLE OF ENGINE WEIGHTS

MAKE	MOD.	CU. IN.	WGT. LBS.	WITH TRANS.	TRANS. TYPE
Buick	40	248	700	.....	.....
	50	263	700*	.....	.....
	70	320	835	.....	.....
Cadillac	1936-48	346	887	987*	3-Speed
	1949-51	331	699	903	Hydramatic
Chevrolet	6	216	575	636	3-Speed
Chrysler	6	250	634*	814	4-Speed
	8	323	827*	1007	4-Speed
DeSoto	6	236	625*	805	4-Speed
Dodge	6	230	575	752	4-Speed
Ford	4	119	342	.....	.....
	V-8-60	135	375*	.....	.....
	6	226	559	684	3-Speed
	V-8	221	525	.....	.....
	V-8	239	569	729	Overdrive
Mercury	V-8	255	580*	733	Overdrive
Hudson	6	308	700*	750*	3-Speed
	8	254	700	750	3-Speed
Kaiser	6	226	565	628	3-Speed
Jaguar	XK-120	210	530	640	4-Speed
Lincoln	V-8	337	862	1056	Overdrive
Nash	L-head	172 184	435*	550	Overdrive
	OHV	235	690*	787	Overdrive
Olds	Rocket	303	700	897	Hydramatic
Packard	200	288	765	845	3-Speed
	300	327	765	890	Overdrive
	160	356	920*	1040	Overdrive
Plymouth	6	217	574	634	3-Speed
Pontiac	6	239	632	702	3-Speed
	8	268	697	767	3-Speed
Stude	6	169	425	505	Overdrive
	V-8	232	575*	.....	.....
Willys	L-4	134	425	525	Overdrive
	F-4	134	450*	.....	.....
	L-6	148	440	540	Overdrive





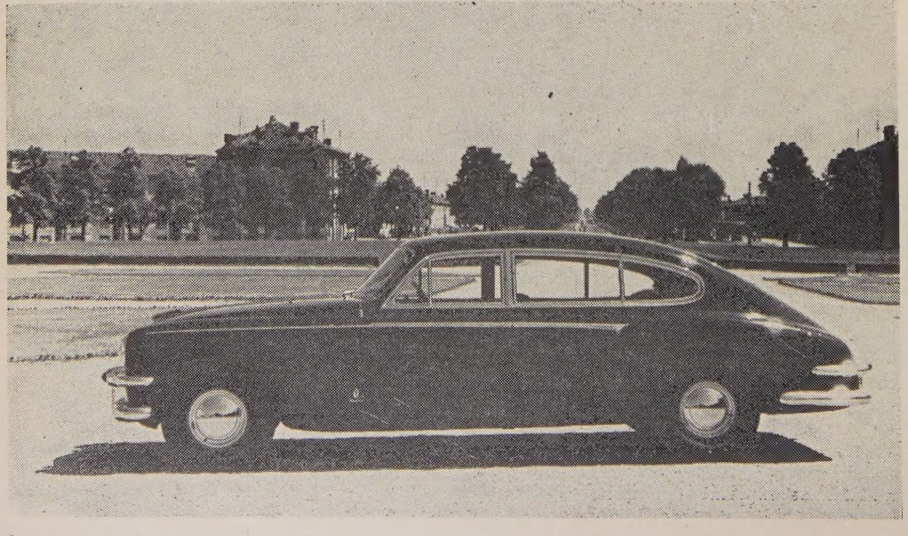
Above, the Alfa Romeo coupe with low, beautiful lines. The air intake retains the traditional Alfa center grille, flanked by auxiliary air scoops for ample cooling area.

At left, the length of the Alfa is emphasized thru sloping rear deck and long hood. Aluminum paneling is used thruout, as in most Italian designs, lowering the weight.

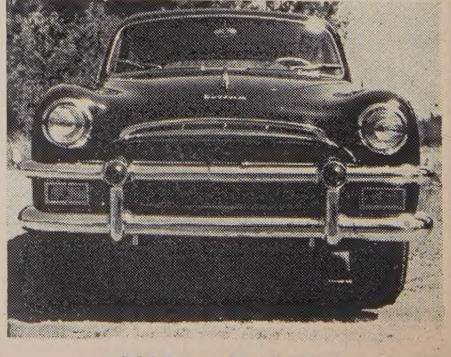
The Latest from Pinin Farina

Pinin Farina needs no introduction to readers of Road and Track. Here are two of his latest creations, an Alfa Romeo coupe, and a Chrysler sedan; both with different appearance than his usual semi-production bodies.

At left, the Chrysler looks high and old-fashioned compared with the Alfa, yet possesses many interesting features. The novel window outline is most predominant, lavishly trimmed in chrome to suit purchaser's taste.



Below, the grille is simple and practical, avoiding the ugly "massive" look of the American Chrysler front. It seems that every year American manufacturers have a contest to see which car has the most chrome.



285 HP GMC ENGINE!

WAYNE F. HORNING PRODUCES MODIFIED STOCK ENGINE FOR RACE AND SPORTS CARS

by John R. Bond

Just three years ago, Wayne Horning introduced his "Wayne" cylinder head for the Chevrolet engine, and since that time Wayne-Chevrolet converted engines have demonstrated that this basically sound engine has just as much, if not more, potential for developing high outputs as the ubiquitous Ford V-8.

Now Mr. Horning has gone a step further and, using the GMC truck block as a starting point, has developed a complete racing conversion, available in much larger displacements than the Chevrolet.

Let no one deprecate the choice of a GMC block. In racing parlance, an engine is no better than the ability of the "bottom end" to stay "put." The GMC block assembly is well designed, with large bore, short stroke, sturdy connecting rods, a very rigid crankshaft, and large-size bearings of copper-lead alloy. Given the ability to "breathe," thru large valves and ports, plus stamina at high rpm and you have high horsepower. The Horning designed and built cylinder head is available in compression ratios of over 12.5 to 1 and has large valves which still permit adequate water jacketing around the valve seats. Consequently, the "breathing" ability is more than sufficient for speeds up to 5500 rpm, which is about the limit for push rod actuated valves in an engine of this size.

On a carefully calibrated dynamometer (using a beam scale for direct torque readings) the power curve shown was obtained. This curve was run with straight methanol alcohol as fuel, and the points are not flash readings. An additional run was made with 10% nitro-methane added to the fuel, giving a flash reading of 290 bhp, and a sustained output of 285 bhp at 5000 rpm—held for 30 seconds. Hence, the Horning guarantee of "over one horsepower per cubic inch" . . . . this particular engine had 274 cu. in. displacement. Incidentally, Horning says that these bhp readings could not be sustained until he switched to Grant piston rings.

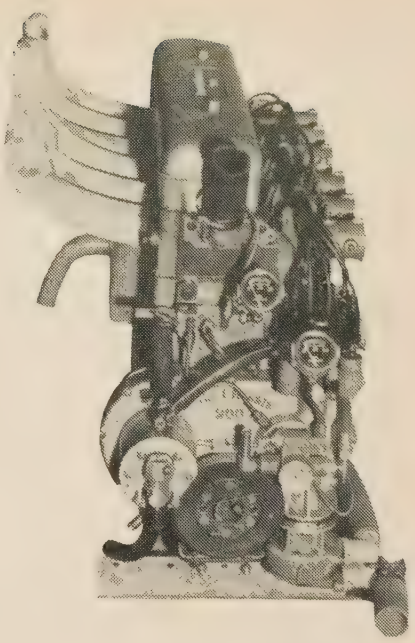
Both International Formula I and Indianapolis rules allow 275 cu. in. (4500 cc) as a maximum displacement for unsupercharged engines, and the potential of this engine for Indianapolis can be appreciated when it is realized that the 270 Meyer and Drake engine develops between 300 and 325 bhp at 5000. The real accomplishment of the Horning engine is, however, that the cost of all this horsepower is not more than one-fourth of the conventional 4-cylinder Indianapolis engine and, furthermore, the lighter reciprocating weight and lower piston speed of the smaller cylinders should actually insure even better durability. The weight of this GMC conversion (without flywheel) is under 500 pounds, so very little if any weight penalty is entailed.

The smallest GMC basic engine is offered in 3 displacement sizes, using 3-bore sizes, 2 crankshafts, and 2 blocks. All other parts are interchangeable. This line-up, plus other displacements available, is shown in the following tabulation.

All possible combinations of bore and stroke are not shown, and virtually any bore from 3 9/16 to 3 15/16 can be used with either of the two crankshafts. Of interest to sports car enthusiasts is the 4,944 cc version which falls into class C by FIA ruling. With say 225-250 bhp available (on gasoline) and at least 100 pounds less weight, the Cadillac-Allard domination in this field could be at an end.

Aside from the variety of sizes available with this new engine, there is also considerable choice in other ways. Illustrated is the "all out" version which gave the horsepower figures previously mentioned. This uses six injector type carburetors, often erroneously referred to as "fuel injection" (true fuel injection requires individual metering pumps, timed to squirt either into the port or directly into the cylinders only during the suction stroke — somewhat similar to the diesel injection system). Also shown is the special accessory group developed by Horning, which drives the dual oil pump, water pump, and distributor at the front end. This

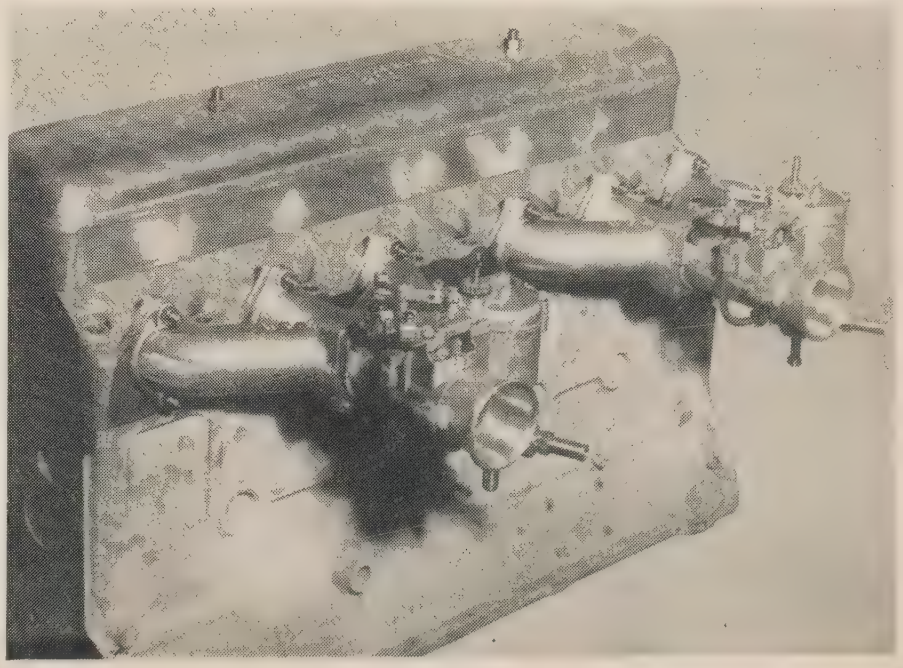
(Continued on page 28)



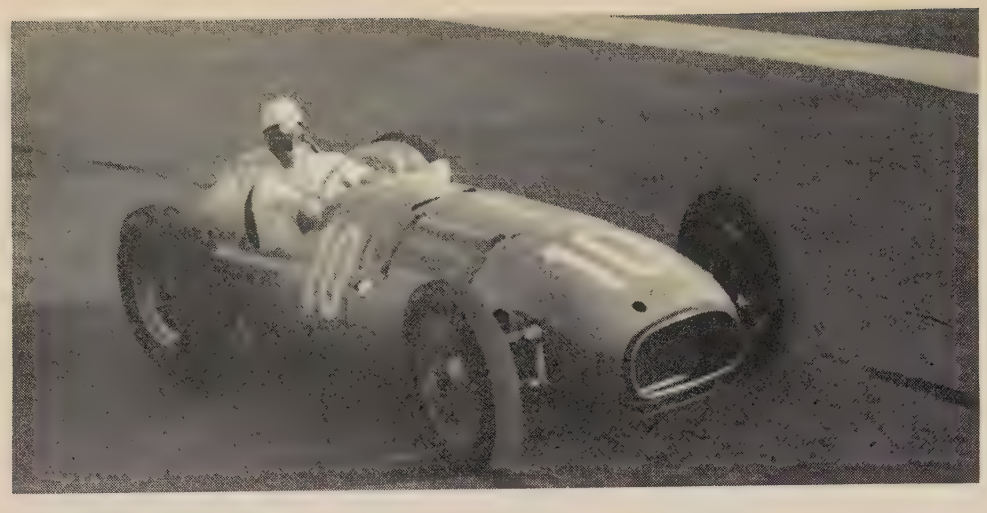
The Wayne Horning GMC engine showing accessory installations and 6 injector type carburetors. This is the "all-out" version.

BORE	STROKE	DISPLACEMENT CU. IN.	CC	REMARKS
3 9/16	3 13/16	228.0	3738	GMC "228" Model
3 23/32	3 13/16	248.5	4074	GMC "248" Model
3 25/32	4	269.5	4418	GMC "270" Model
3 29/32	3 13/16	274.1	4494	Horning "Indianapolis"
3 15/16	3 13/16	278.5	4566	Horning Option
3 15/16	4	292.2	4791	Horning Max. Recom.
4	4	301.6	4944	Has been done

The alternate installation of conventional side-draft carburetors on special manifolds. The Wayne Horning cylinder head is a 12 port design, with intake and exhaust on opposite sides.



B.R.M. at BARCE



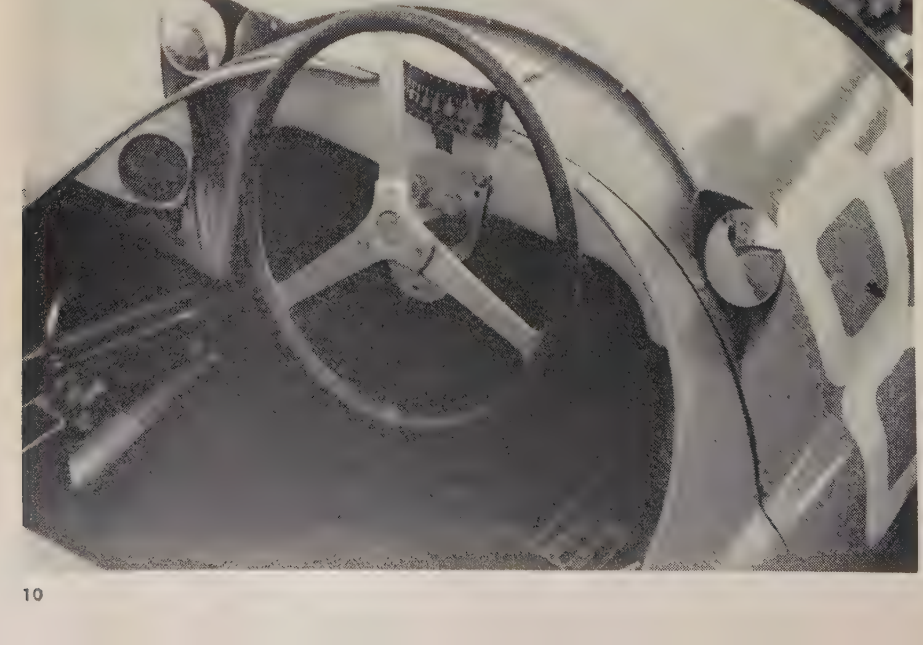
The BRM in action. Very light suspension uses compressed air. Road holding is excellent.

Comparison Between BRM 1500 cc Blown & Ferrari 4500 cc at the Last 1950 Race

by Corrado Millanta

Changing the BRM's spark-plugs, which is, on a 16-cylinder engine, a really long job. The box atop the engine contains three series of spark-plugs with different thermal ranges. A good pit crew is important to success.

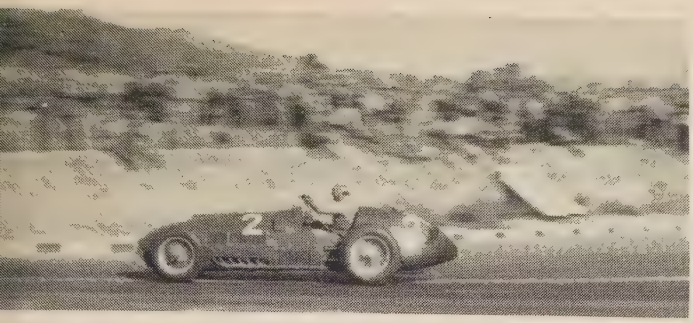
Very simple disposition of instruments in the BRM. At the center is the electro-magnetic tachometer, at left inside is the double thermometer for water and oil. On the floor is the five-ratio transmission gear selector.



The 1950 Pena-Rhin road race was really important and particularly interesting because of the presence, at Barcelona, of the Ferrari unblown 4500 cc cars, which had already seriously menaced (at Monza, Italy) the blown cars, and the two British BRMs. This race interest was not only the result of the reappearance, with *great pomp*, of real British Grand Prix cars,*1 but also by the foreseen and expected competition . . . as always in Formula I races . . . with brand new cars designed in two entirely different directions, which are: the 4½-litre unblown car (Ferrari) and the 1½-litre blown one (BRM) that may well be the last 1½-litre supercharged Grand Prix car to be designed.

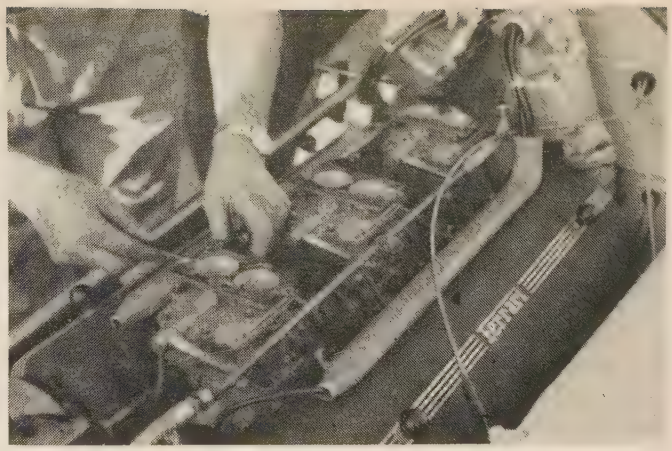
The Ferrari 4500 cc specifications are: 12-cylinder 60° vee, 4493 cc displacement, 80 x 74.5 mm bore and stroke, compression ratio of 14.5 to 1, 330 hp at 6200 rpm, piston speed of 3031 feet per minute, 73.5 hp per litre, dry weight of 1570 pounds, and a power/weight ratio of 4¾ pounds per hp.

About the BRM: it was created by co-operation of 120 British specialized companies. One of them, the well-known Rolls-Royce, built the supercharger and many engine components. One of its outstanding characteristics is the division of capacity (1500 cc in 16 cylinders), which is a record in this case, because never has there been a Grand Prix engine with such small cylinders. The displacement of a single BRM cylinder is only 94 cc, which is very small in comparison with one well-known pre-war Grand Prix car, the Mercedes 8 cylinder 125 of 1937, which had 710 cc displacement per cylinder. It is also interesting, as a matter of comparison, to notice that notwithstanding the high speed of the BRM engine—11000 rpm, the piston speed is only 3445 feet per minute. Because of the very short stroke of 48.6 mm (49.5 mm bore), this p.s. is less than the Mercedes, which had a 94 mm stroke and a piston speed of



ONA

Ascari, the winner of Pena-Rhin race with the new Ferrari 4500 cc unblown race car.



Ferrari 12-cylinder 4500 cc unblown engine. The big air intake has been removed, revealing the three Weber dual carburetors.

3543 feet per minute at only 5800 rpm (which is half of BRM's rpm).

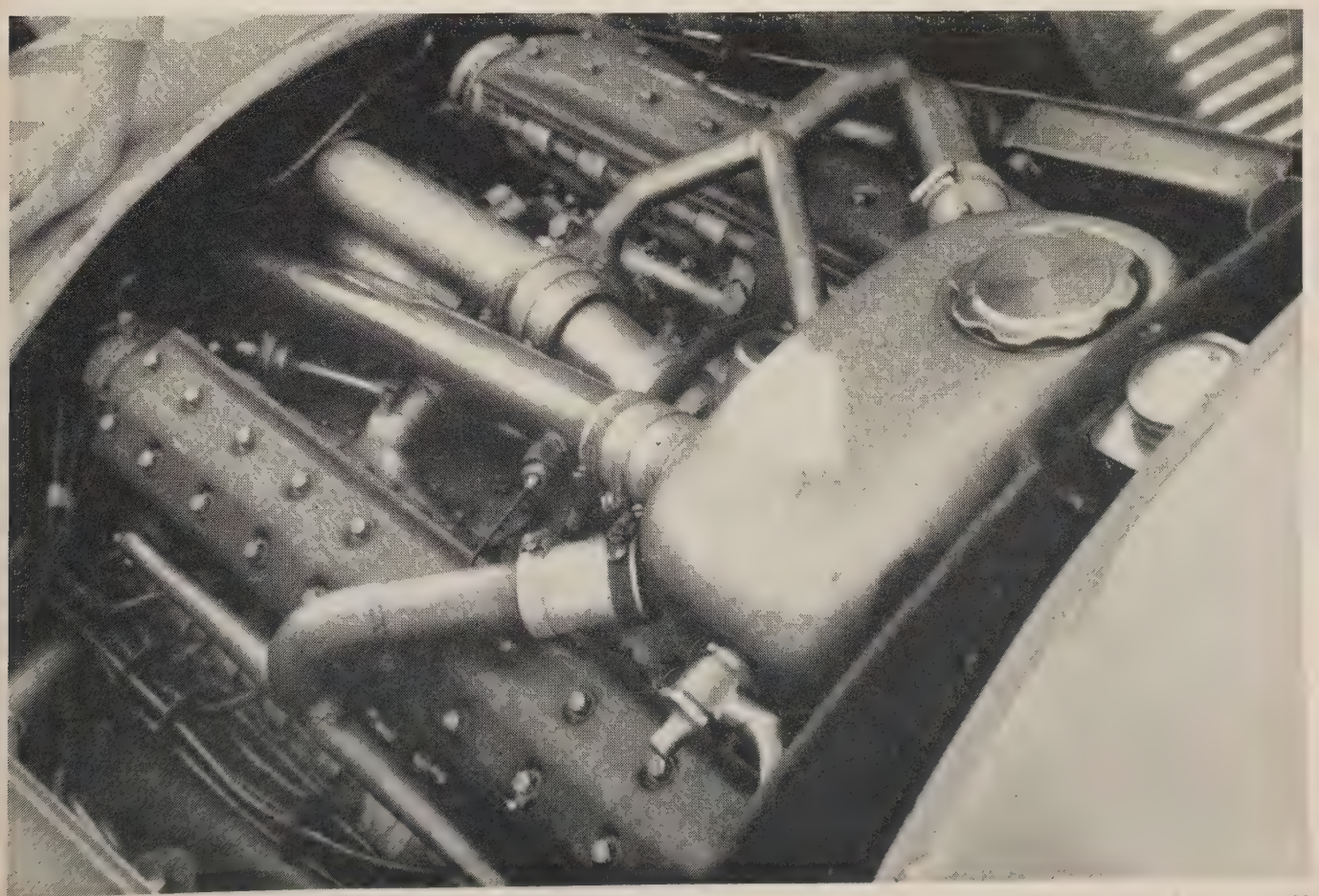
One of the most interesting features of the BRM is the supercharging system. The blower is not a Roots, but a centrifugal one. This choice, for a car to be used in European races, is amazing at first consideration because it is well-known that a centrifugal supercharger, even tho it gives more power at maximum rpm than the Roots, is not suitable for rapid deceleration followed by thunder-like accelerations.

Therefore, at speedways like Indianapolis where a simple circular course allows the engines to run always at practically the same speed without being under a series of interrupted accelerations, a car equipped with a centrifugal supercharger could be very much indicated, but it is an entirely different matter when we talk about European road racing circuit. Rolls-Royce engineers have, however, added to the centrifugal supercharger a disposer which would give, and this is the most important characteristic of the whole car, in low and medium ranges the same power or even more than the Roots, yet retaining its ability to provide the highest boost at maximum range, due to the Roots requiring more power to drive than the centrifugal one, especially if it is used in a two stage design. Judging by the results of the Pena-Rhin race, however, this higher output seems to exist more in theory than in practice.

By a careful examination, the BRM seems, in its conception, to be the most advanced and detailed blown race car yet built, but unfortunately, very complicated. The complication also means, in this case, excess weight. In fact, it is said by some, and perhaps not without justification, that this car weighs about 900 Kg (1984 lbs), much to the exasperation of the engineers. It is to be remembered that the Mercedes model 125 weighed only 750 Kg (1653 lbs without tires), being a blown car, powered with a 5660 cc, 646 hp, 5800 rpm engine. The BRM is rated at 400 hp, but by comparing its speed with that of the Ferrari

(Continued on next page)

The BRM V-16, 1500 cc engine with centrifugal supercharger. Theoretical output of 400 hp @ 11000 rpm—double overhead cams. The supercharger can not be seen. Crankshaft and connecting rod bearings are thinwall. Altho designed for fuel injection, it is temporarily using two carburetors. With Roots type 2-stage blower, output could be 480 hp, "The Motor" says.



4500 cc at Pena-Rhin, we have seen that the 400 hp of BRM is only in theory. But even accepting the enormous figure (more than 265 hp per litre), the power/weight ratio would be very low if one uses the rumored weight of 1984 pounds . . . 4.96 pounds/hp. The Ferrari 4500 cc (330 hp, 1565 pounds) has an actual 4.74 pound/hp with an efficient and reliable engine. This figure is slightly lower in the Alfa-Romeo engine, Model 158-159. We see then, that the complicated design of the BRM does not seem to be justified, particularly in view of the new Ferrari 4500 cc, which is less expensive and lower in fuel consumption*2, as demonstrated in the Monza and Barcelona races.

However, it remains true that the BRM, if in perfect condition and fulfilling design expectations would be the most potent car of today's Grand Prix race. Even if it does have more weight per horsepower than Ferraris and Alfas, we believe that, as probably is the idea of its engineers, its engine would be sure, especially in the middle rpm range, to develop more horspower than the competitors, obtaining in consequence not only more speed, but also more acceleration, which is more important for the European races.

Now the results of Pena-Rhin competition are the following:

During practice

Ferrari

Better times than BRM. No mechanical difficulties at all.

BRM

Time inferior to Ferrari. The car driven by Parnell suffered broken rods in the rear left 4 cylinder group.

During the race

Ferrari

Three cars took the lead at the start and arrived in the first three places, in very good condition, without stopping for gas or for tire changing. Speed: 11 mph faster than the BRMs.

BRM

Parnell's car, which early in the race was in 4th place behind the three Ferrari, retired on the second lap due to a broken supercharger drive. The BRM driven by Walker was delayed by several stops and retired before the end of the race. It should be noted that the 3rd Ferrari, driven by Taruffi, had an engine of only 4080 cc displacement, yet it made a time equal to the 4500 cc model driven by Serafini. This would indicate that the Ferrari 4500 cc cars were not at the maximum effort.

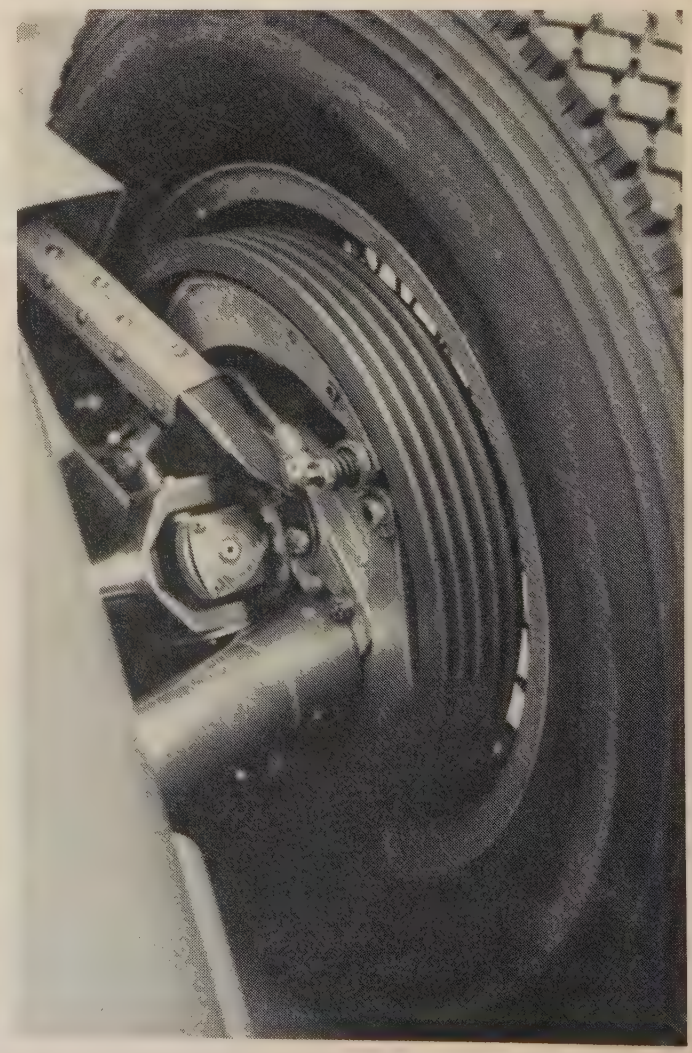
The 1951 racing season promises to be really interesting in both sports and technical aspects. We hope that the BRM, during the winter season, will be perfected because Alfa Romeo is working on a new 8 cylinder 1500 cc model, and on the old 12 cylinder engine of 1500 cc which has never made its appearance in a race. About Ferrari, after the first satisfying results of their unblown engine in 1950, they are working to improve the 4500 cc unit by employing dual ignition. Not only that, but by the sketches we have seen, it is possible that Ferrari will build a 4500 cc engine with dual overhead cams. They say that Mercedes is preparing to return to racing with 1500 and 2000 cc models. There will also be the debut of the OSCA 4500 cc, now under construction by the Maserati brothers.

*1 Objectively talking, the ERA cars cannot be considered as really Grand Prix cars, because they were built in 1935 to fit the voiturette class rather than the Grand Prix formula of that time. They qualify for today's Formula I races just by coincidence, being used in several postwar Grand Prix races, but always without a possibility of winning. The last British Grand Prix car was the Sunbeam of 1923/24 . . . a 2 litre blown car, 6 cylinders, developing 138 hp at 5500 rpm. It won the French Grand Prix at Tours in 1923 and the Spanish Grand Prix at San Sebastiano in 1924.

*2 The lower fuel consumption is important because a pit stop for fuel of one minute duration can lose over a mile to a close competitor.

Details of BRM front suspension of trailing arm design. Notice the beautiful steering arm, an excellent example of diligent, elegant and expensive work. The three leading shoe brake is completely uncovered. Note riveted joint of light alloy wheel rim. A rare photo.

BRM universal joint, rear suspension and brake. Like the front, the rear brake is completely uncovered. Suspension is classic de Dion.



Custom Styling.....

STUDEBAKER BY GOERTZ

Line after line, and row after row of gleaming new Studebakers. . . . such was the sight which greeted Albrecht Goertz each day as he joined other members of the Raymand Loewy organization in their task of designing future rows of Studebakers. This monotony precipitated the "Goertz," a custom Studie.

Returning to the original concept of the coupe—most "coupes" of today are actually two-door sedans—Goertz recaptured the intimate closeness which has long since been lost in production design. Overall height was reduced by lowering the seats and top a corresponding amount. A new hood line dives low between the front fenders to meet a simple but effective mesh grille, giving a very European appearance.

To provide performance appropriate to the design, a Mercury engine, somewhat hopped-up, was installed.

Having now established himself as an independent industrial designer, the car is of great assistance in publicizing the name "Goertz". . . . many people believing it to be a popular European make.

How to Drive . . . in a Road Race

by Grampaw Throttlebottom

The best driver is he who wins at the slowest speed. Leave us now fire her up, and blat off from the pits, having taken a cowardly look over our shoulder to assure that Bonzo is not just passing at full bore. (So you think that's not a necessary reminder? Hah!)

The racing car, like your family Super-Gomflopper, may be maintained at less cost if, when cold, it is warmed up gradually. This does not, in the racing car, mean just the engine, but also the gear-box, prop-shaft universals, back-axle, wheel bearings and a host of other brittle bits, all more or less subject to the need for lubrication, and to a varying degree benefited by the avoidance of high revs when cold. Bear in mind that the pinion gear is travelling past the ring at 6000 rpm when the tach indicates this in high gear. A lovely, warm engine means nothing to the back end on a brisk March day.

So let us depart with discretion, and due reverence for the O.A.T.,* making the first lap with modesty. The excuse of babying the car will also serve to cover your own need to "warm up" yourself. It is a great truth that an inexperienced driver will make better time during the race than he did in practice. Only the hardened hand can produce faster time in practice than in the race, which is as it should be.

The best driver is he who wins at the slowest speed.

After a few laps, the driver's sense of timing is better geared to his actual progress, and only then is he ready to really pour on the coal and ascertain his "cutout" points. This is because the average normal citizen is accustomed to driving at speeds up to 60 and 70 mph, but only rarely does he experience three-figure speed. Imagine yourself limited 99.9 per cent of the time to 30 mph and ask yourself how reliable a judge of speed and distance you would be at 70, given no time to "practice"? Now, who wants to step up to the bolide and crack off with a "cold" qualifying lap?

There are old racing drivers, and there are bold racing drivers, but there is a great shortage of old, bold racing drivers.

Once the car is warmed up, you are warmed up, the hazard on the back-stretch you didn't know about has been observed, the quantity and quality of fellow circuit-lappers has been noted, and you have discarded the new pair of goggles that seem not to fit any more, you are ready to "creep up" on your cut-out points.

The cut-out point is the key to "going like hell." Without a cut-out point you are not only dangerous and erratic, you are slow, brother. Your cut-out point is the place where you are going to remove your foot from the accelerator and place it firmly on the brake pedal, that is, you are going to do this if you plan on getting around the corner in one piece. Of course you can forget your cut-out point and live thru it by abandoning *immediately* all idea of getting 'round the corner; instead, driving perfectly straight up the "escape road" (which should be a straight continuation of the road you have been coming along). Every respectable road-racing circuit should have an escape road at each abrupt turn. Bends will rarely have escape roads, but escape roads are essential at right-angle turns, if the circuit is to be considered reasonably safe. In short, wherever heavy braking must be resorted to, the organizers should plan on providing an escape road, or there is going to be trouble.

In the event then, that there is *any* doubt in your mind about your making the turn safely, *use that escape road;* that's what it is for. Now so you won't need to use the escape road, which will involve stopping, turning around, driving slowly back to circuit, and waiting until it is clear before proceeding back into the race, let's select those spots before each turn, beyond which you can no longer expect to brake the car in sufficient time to reduce its speed from the 100 per you have been making, to the minus you *must* be making, at the apex of that corner.

This might be a good time to admit that even Nuvolari slows to 30 when the turn is so sharp he can't make it at 31. More on this, later. It is surprising how much pressure one can exert on a brake pedal, given sufficient motive. In your day-to-day driving, you will never use this pressure except when you are having a wreck. It is pressure very much on that order that we refer to, when we say "heavy braking."

So you must expect to explore most of the escape roads around the circuit, in quest of that "last, last point," during the official practice period. While you need not be ashamed to use an escape road during the race, during practice, well, you will meet some of our best people up there!

May we assume then, that you have thus discovered that such-and-such point is just too darned near, and that such-and-such other point is needlessly far away, assuming "heavy braking." You will also have discovered that not the least among desirable handling qualities in a car, is its ability to withstand heavy braking without wagging its tail, swapping ends, or developing "judder" of the front wheels, (a particularly vicious form of wheel tramp curable by relieving the braking pressure, and settling for the "E.R."**). You will have further discovered that a car under heavy braking is unstable, to a large extent, in a manner reminiscent of the instability of a very powerful, light machine when accelerating. In short, the car seems to sway, and does indeed strain to alter course, as bumps, etc., bounce it about. So, under heavy braking, you must be ready to correct all of the incipient skids that are crying to be born under your rear wheels. (If the car is exceptionally front or rear-end heavy, these bad tendencies will become vicious.)

So now you know where the "last" cut-out point is, and it should be marked in your mind with reference to some object clearly visible as you approach at speed. Unfortunately, that convenient telegraph pole, tree, sign, etc., is never *quite* where you would like it, but generally you can find a marker sufficiently close to your point so you can gauge it with extreme accuracy. S. C. H. Davis, the inimitable "Casque" of the British motoring magazine *Autocar* drew a wonderful cartoon, showing the plight of the driver who "picked a cow as a cut-out point." It is only necessary to add that spectators are equally unreliable, so be sure the marker you have selected cannot be moved during the course of the race.

So much for the "last" cut-out point. Obviously, you cannot drive like that for the whole duration of the race. Even if you could stand the physical strain, (some drivers undoubtedly can and even do) the car, unless it be a *very* remarkable full Grand Prix machine, will probably be unable to cope with such punishment. Certainly the average "raceable" sports-car will develop brake-fade after a few laps of steady "heavy braking" into each acute turn.

Generally speaking, brake-fade is a product of heat, and the brakes may be "heavily" used in proportion to their ability to dissipate the resulting heat. A "stock" brake is seldom able to withstand more than one or two such applications, a superior modern brake may take more. Ribbed drums, ventilation-ports, "Alfin" drums, etc., etc., will all permit increased brake loading. Speed affects the heat build-up very severely, and successful testing of brakes at 60 or 70 mph will not be any assurance that they will stand 100 mph. Likewise, a short or twisty straight, which limits your approach speed to 60 instead of 100, will permit you to "use" more brakes on that particular corner without seriously impairing their efficiency.

The best driver is he who wins at the slowest speed.

It has been said that the good drivers bring their cars in "tired" at the finish of a race, not "shot" and not "unused." You may expect to use all the components of your car to the limit of their ability when pressed, but these limits must be viewed in light of the length of race, the possibility of your being seriously "challenged" at a later stage of it. etc., etc.

One Obvious Point

One rather obvious point might as well be made right now. Your cut-out point should still be sufficiently far from the apex of the corner, even the cut-out point intended for use under the heaviest braking, to allow ample time in which to get your right foot off the brake pedal *so the front wheels are able to steer.* This simply means that you will discover your car is unsteerable if you attempt to wrap the wheel hard over with the brakes full on. Even at the slow speed of 25 mph, "steering" with the brakes on is singularly unrewarding. The car simply plows ahead, straight for the straw, regardless in what direction the wheels are cut. Should you ever find yourself in this silly predicament, take your foot off the brakes, and you will at least slide sideways off the road instead of pitching off head first. Four-wheel drag being twice as good as two-wheel drag, and the side of your car being less expensive than the front, you may prefer to swat the former. Besides, there's always the chance you may yet make it, with maybe a mild bump from a bale. Fear not to turn over, assuming you are really down to 25 mph. At that speed you should have ample time to duck under the scuttle.

At this point, we have negotiated the straightaway, survived some heavy braking, gotten our foot off the brake pedal, and in fact, are all set to "position" for the corner (with some space left to "position" in, naturally!).

This is the time to regard some of the attached drawings. As will be seen, the driver appears to be a devotee of the axiom: "a straight line is the shortest distance between two points." Such is not actually the case, however. The reason it is "right" to follow the course shown in Fig. 2 and "wrong" to follow that indicated by Fig. 1 is because of the instability induced by

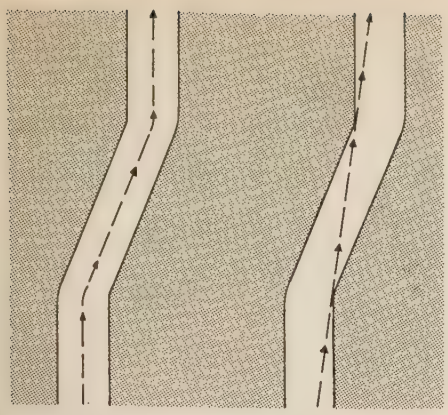


Figure 1 Figure 2

swaying the car. You do not follow the route in Fig. 2 to save distance so much as to keep the machine as "quiet" as possible, as "undisturbed" as you can.

This is all so because the great truths about cornering are intimately connected with the interplay of two forces. The first of these is centrifugal force. It is the force which causes a stone to be projected straight out when the string it was tied to, and which was swung violently around your head, is broken or cut. The other force, which balances the "outward urge" is tire adhesion, or traction. Obviously then, a style of driving which eliminates all unnecessary deviation from the straight line, is not only easier for the driver, but creates a relative increase in traction. Put simply, the car is more stable the less you horse it about.

At 70 mph the car feels as does one driven on gravel at 40. At 90 mph the car feels as does one driven on snow at 60. At 130 mph the car feels as does one driven on ice at 70. Needless to say, these are approximations intended only to convey a general impression of the driver's respect for the low tractive forces and the high inertia forces experienced at speed.

It is obvious that if a very sharp corner be taken at high speed, the centrifugal force will be far greater than the restraining tractive effort of the tires. The tractive effort is the product of the area of tread actually in contact with the ground (about four to six square inches per wheel) times the weight on that wheel. In theory, a knife edge should have the same tractive effort as a tennis-shoe, assuming the former were loaded with compensating additional weight. In practice, the motion, and consequent induced bouncing of the wheel over the imperfectly "level" road, cause first one and then another portion of the tread to be in contact with the ground, while most of the rest of it is at one instant or another just batting the breeze. Large section tires are often resorted to (even dual rear wheels, for hill climbs) because under certain conditions they have the practical effect of increasing traction. But that is a practice which should not be accepted without restriction, as a panacea. Often, a larger section tire results in poorer handling qualities, as for instance, when used on the front wheels of an M.G.

After the tires (and, surely, the rest of the car) have been "forced centrifugal-wise" (toward the outside of the bend) beyond their tractive ability, the modern sports or racing car will probably slide rather than turn over. As a matter of fact, the modern American sedan would probably slide too, as their centers of gravity have actually been very substantially lowered in the past twenty years. Let's just say that after your tires have gone on strike, the car will slide sideways, unless the center of gravity is so high that it has tipped over even while the tires were still gripping. Even in an American sedan then, there is not much chance of "turning over." These cars do that, in seemingly increasing numbers, but in almost every case, while it was skating madly sideways, its wheels got caught on a curbstone, ditch or such-like immovable obstacle.

But in your sports-car you will start to slide, and as has been said, towards the outside of the corner. The outside because the car has "momentum," meaning that it wants to keep on going in the direction it has become accustomed to, and assuming you have entered the turn from a straightaway, that direction will be a prolongation of the straightaway. The slide will continue until the speed has gone down enough for the tires to grip again, and the car suddenly re-commences to answer the helm.

The Inevitable Penalty

Sliding is the inevitable penalty of entering a turn faster than your car can get around it. If Nuvolari's car loses traction at 31 on a 30 mph corner, you may be sure that Tazio will be in a slide. There is no ju-ju whereby you can avoid this natural law of physics, even though you be a clean young American hero and sexy as the devil. Grand Prix drivers, you may be amazed to know (I was), slow for the sharp bends a lot more than most of us do! They slow down so darn much that they simply poop around without even a squeal; remember, we are talking of *slow* corners like the club-house turn at Bridgehampton, or the turn at the end of Main Street at Watkins Glen. The assumption is that in a 300 mile race, this is so much easier on driver and car, not to mention tires, and so little slower than a full power-dice, that they have elected to ease around and then settle down to exploit their tremendous acceleration. (They also thunderously use their brakes.)

If you find yourself in a slide, the quickest and happily, the easiest remembered cure, is to ease your throttle foot a bit. Technically put, this tends to shift the dynamic c.g. forward, increasing traction of the front (steering) wheels, but not affecting the "lighter" rear wheels because their rotational force is reduced by the slackened throttle. In a front-wheel drive car, the brave pilot will find himself in a pretty pickle. If he starts to slide, the cure is to step on the gas, making the spinning front (steering) wheels attempt to drag him around. But having increased his speed, he has increased his centrifugal force, and slides all the more. This goes on until the corner is made, or the car runs out of road.

Ease Up!

As one's foot on the throttle is eased, the car should become immediately docile, providing one's speed is only a mile or two faster than proper, the sort of error we most frequently make. But then there is Bonzo to consider, who has attacked a right-angle at 60. First, he slides; outward. Depending on his car's c.g. location, the car will swing broadside to the straight he is attempting to leave, or swap ends and do some fancy motoring in reverse. (If the c.g. is too far forward, it will likely spin like a top, inscribing wondrous black tire marks on the paving.) Let's assume his car is pretty well balanced, and we find Bonzo touring sideways at 50. After a while, even the best bred car will begin to swap ends, assuming no hay has intervened. If he takes his foot right off the gas, the tendency will be greater. Now the driving books tell you to "turn into a skid," which is a hell of a rule to try to follow when you are having one. The better rule is "steer where the car wants to go." The object is to "absorb" the excess centrifugal force at the expense of roadwidth (which you are giving up to obtain temporary relief). On a right turn you can't make, turn the wheels to the left. The normal tendency of the car to let its tail get there first will have positioned your rear wheels farther out than your front ones, nine times out of ten. Now step on the gas. With the wheels cut to the left, your tail wagging near the outside ditch, and the rear wheels rotating furiously, as they scrabble at the paving, you have become: Gus Gasket, Demon of the Dirt-Tracks! (a form of hero).

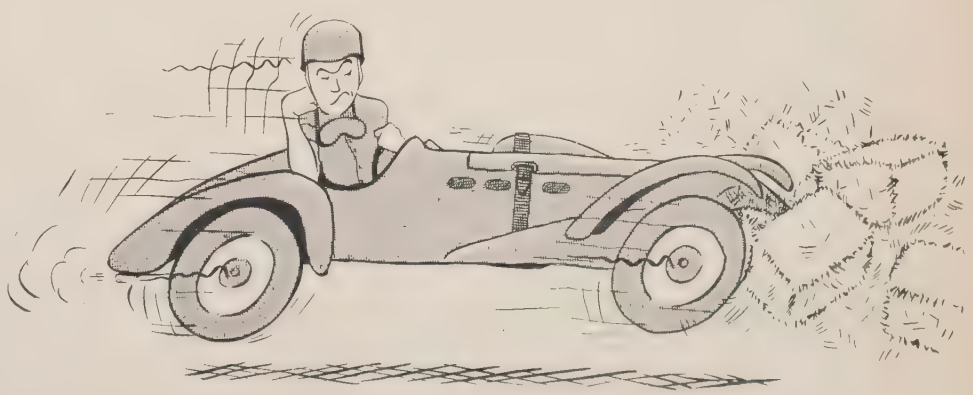
Anyway, it will get you round, maybe.

What is more likely, because your sideways progress has been made at considerable frictional expense, you will be going much slower, by the time you assume the "AAA stance," than you think. So slow, in fact, that a juicy jab on the throttle will cause you to accelerate gloriously, from a position facing the inside curb, with your wheels cut sharp left, to a position facing the outside curb, the tail of your car having screeched into another slide in the exact opposite direction.

At this point, a lot of novice drivers just say the hell with it, and plummet right on thru the hay bales on the outside of the corner.

What has been described is called "overcorrecting," and if you find yourself in *that* situation, just repeat the antidote you "overdid" the first time, (but, naturally, in the opposite direction) and keep right on fightin' 'em, Son. You may get away with it all yet!

(Continued on page 24)



"At this point, a lot of novice drivers just say the hell with it, and plummet right on thru the hay bales on the outside of the corner."

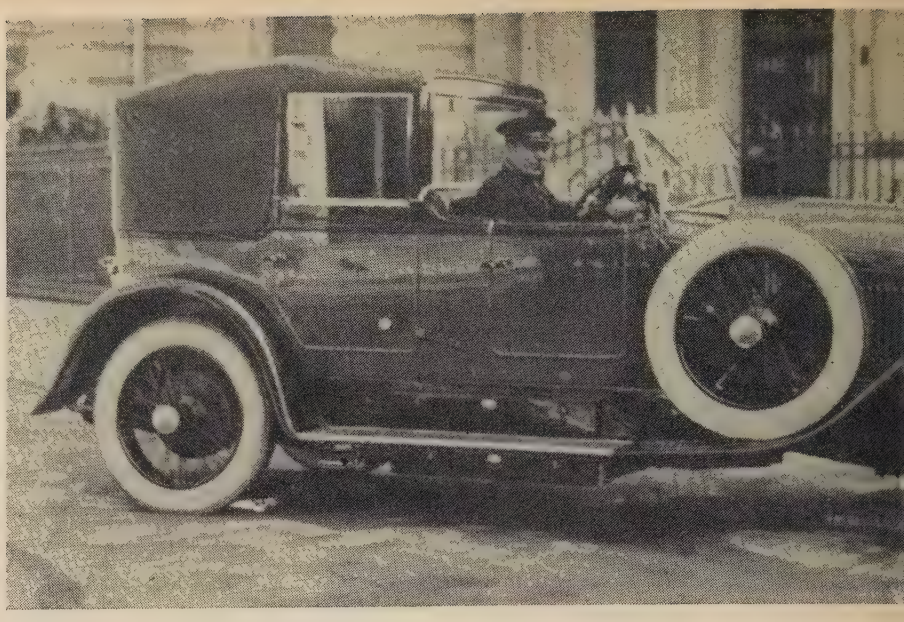
Stabilimenti
FARINA

The Stabilimenti Farina organization began in 1906 as a simple artisan shop. Soon automobile body work began to take the place of horse-drawn carriage building. Among the bodies constructed in the old days was one on the Grigherd chassis with electric engine. Afterwards they built on Peugeot, and de Dion chassis, and after 1907, the "Zero Fiat," Diatto, Ceirano, etc.

These first models had wood spoke wheels, while the body was made of wood framework on which were put hand-wrought metal sheets. The fenders were also made by hand without any of the modern tools. Little by little, construction techniques were improved and changed, interrupted by the two World Wars, when custom work is entirely stopped.

During the last war, the factory was working on war production, and was severely damaged in bombing attacks. In 1945, during the reconstruction period, they started again to build "Carrozzerie" with many special designs for automobile companies thruout the world.

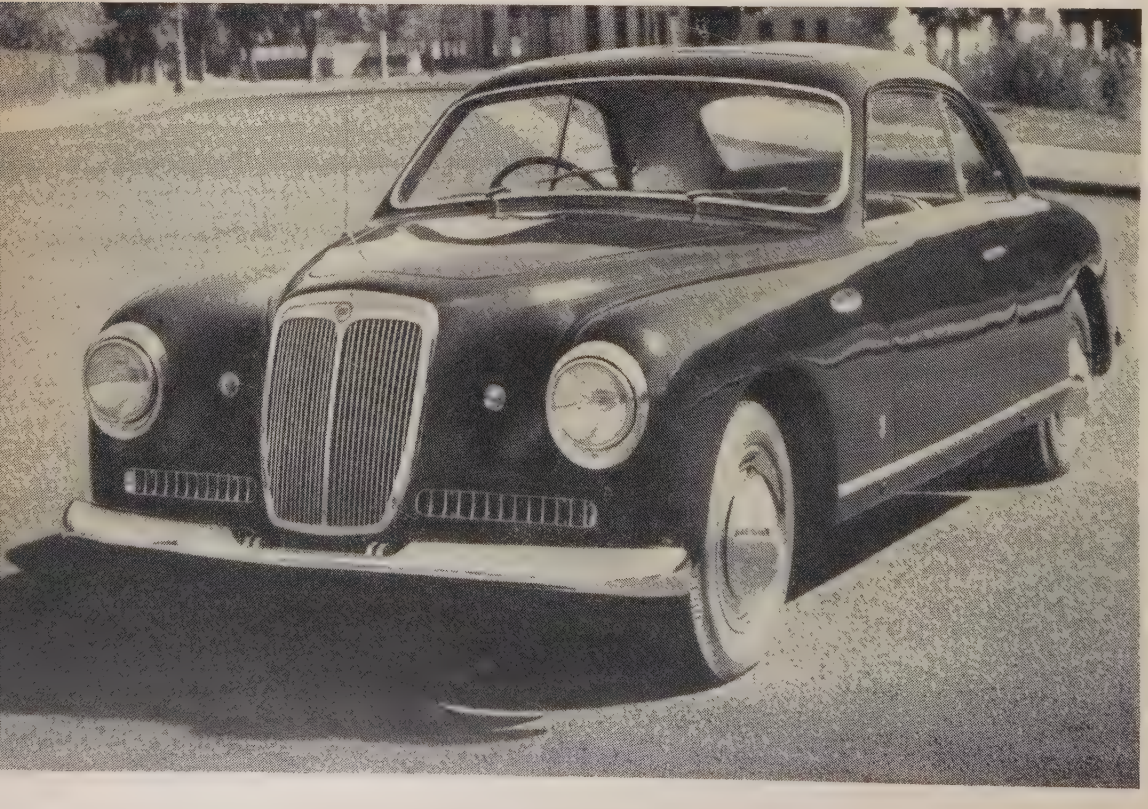
Most of Stabilimenti Farina's records, including photographs of their early work, were destroyed in the war, and therefore, only post-war cars are featured on these pages, except for the 1920 Isotta Fraschini.



This 1920 Isotta Fraschini cabriolet was considered the ultimate in Italian cars in its day. Qu

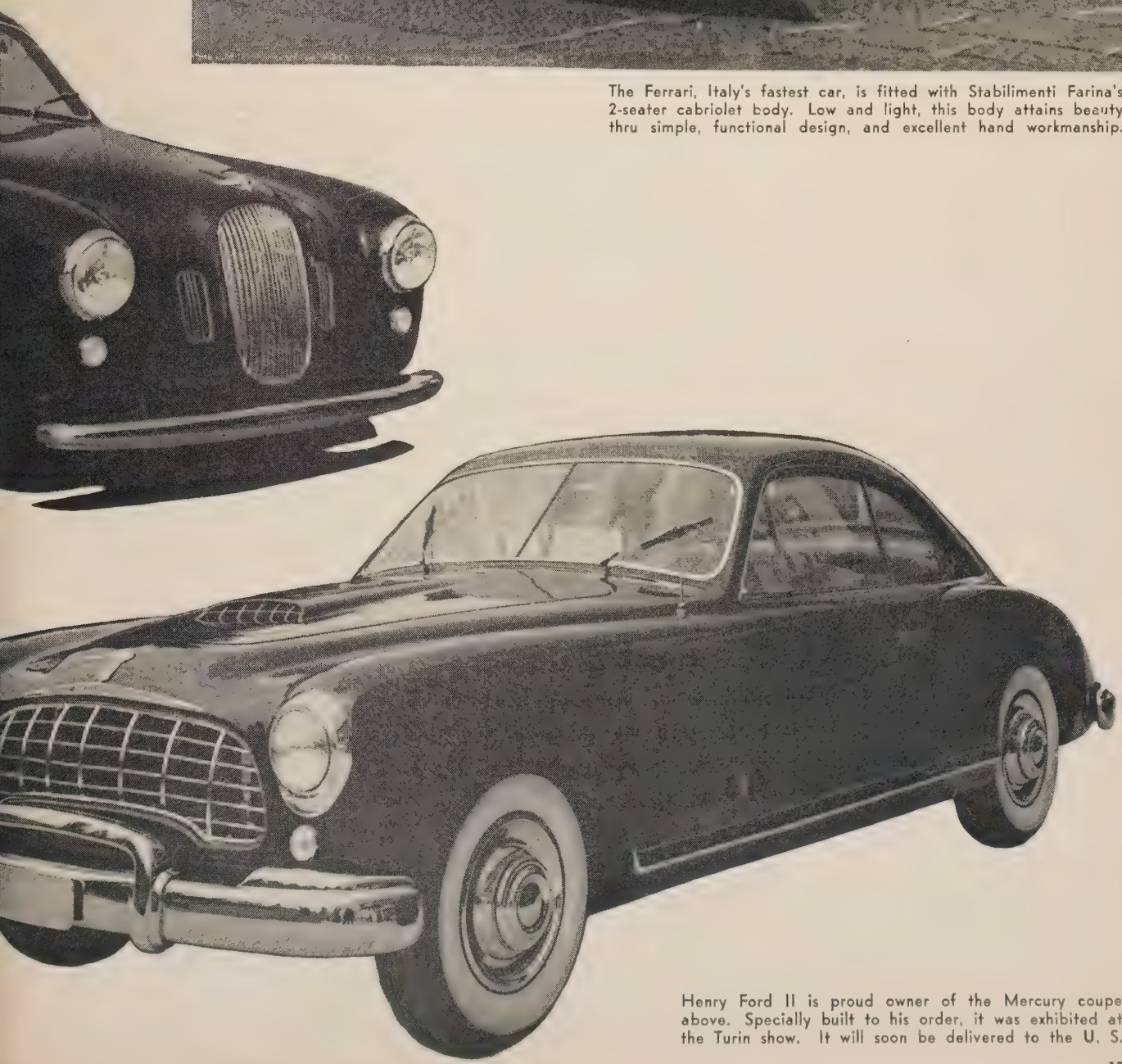
The Jowett Javelin Jupiter chassis is used in this coupe recently completed. The Jupiter's original front grille treatment is retained.

This clean-lined coupé is the Lancia Aurelia V-6. One of the world's most advanced designs, the Aurelia coachbuilder's chassis is popular in Italy.



o present day designs.

The Ferrari, Italy's fastest car, is fitted with Stabilimenti Farina's 2-seater cabriolet body. Low and light, this body attains beauty thru simple, functional design, and excellent hand workmanship.



Henry Ford II is proud owner of the Mercury coupe above. Specially built to his order, it was exhibited at the Turin show. It will soon be delivered to the U. S.

ROAD RACING BOOMS IN SOUTH AMERICA

CURRENT SEASON WILL FEATURE MANY INTERESTING EUROPEAN CARS & DRIVERS IN NON-FORMULA RACES

by Dr. Vincente Alvarez

Argentina's racing fraternity was literally spellbound as the announcement was made, late in 1946, that a choice group of European race drivers had been signed up to compete in a series of road races. While European aces had paid a few visits here, they never got to actually compete, as their cars would not fit our type of racing, and their performances amounted but to mere exhibitions. In 1925, the late Italian Champion Piero Bordino, in a 2-litre Fiat, made some sprint runs on a highway, and Hans Stuck, in 1932, brought a beautiful big Mercedes, which he found unsuited for competition on the roads to be used.

With the advent of the Continental-styled road course races in the late 30's, the opportunity was at hand to add some European color to local contests. It wasn't until 1947, however, that our public was offered what they had been looking forward to for so long. A new breed of road course drivers had developed here in the meantime, and European "specials" became a familiar sight in every race. Local pilots were eager to gauge their ability and improve their technique by competing against Continental maestros. Public reaction to the first International series, run early in 1947, was definitely favorable, and these annual series soon became an institution; attendance, at present, being in the neighborhood of a half-million spectators for a single race. While many—too many—aspects are still liable to serious criticism from the genuine race enthusiasts, these series made it possible to watch closely European race drivers . . . the cream and the others, too . . . and some of their latest race cars (the good ones and the others, too) in action.

The illustrations give an idea of the fine collection of race cars brought over by European invaders in recent years. Some of them proved to have real race potential, while others were a plain disappointment. As no engine size limitation has ever been enforced for these races, and the road courses differ extremely from one another, any comparative summary of performance values in standard terms would be a freak one. It is evident, however, that the 2-litre, 2-stage-blown Ferrari have excelled so far in speed and maneuverability. They are seemingly destined to another clean sweep next year, unless some other make produces a reliable challenger. It could be Alfa Romeo, in spite of their smaller engines (1.5 litres) . . . the owners of Alfa—let alone the drivers—are supposedly determined to put an end to Ferrari's winning streak.

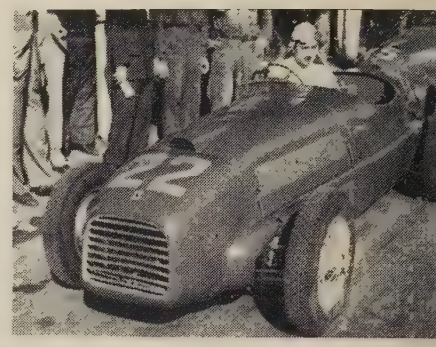
So far this season, one race at Parana has been won by Fangio in a 2-litre Ferrari. Second was Gonzales in another Ferrari, followed by Pian in a Maserati. Average speed was 45.88 mph.

Three Lago Talbots are due to arrive in December for a 500 mile race at Rafaele. They will be driven by Fangio, Gonzales, and Rosier.

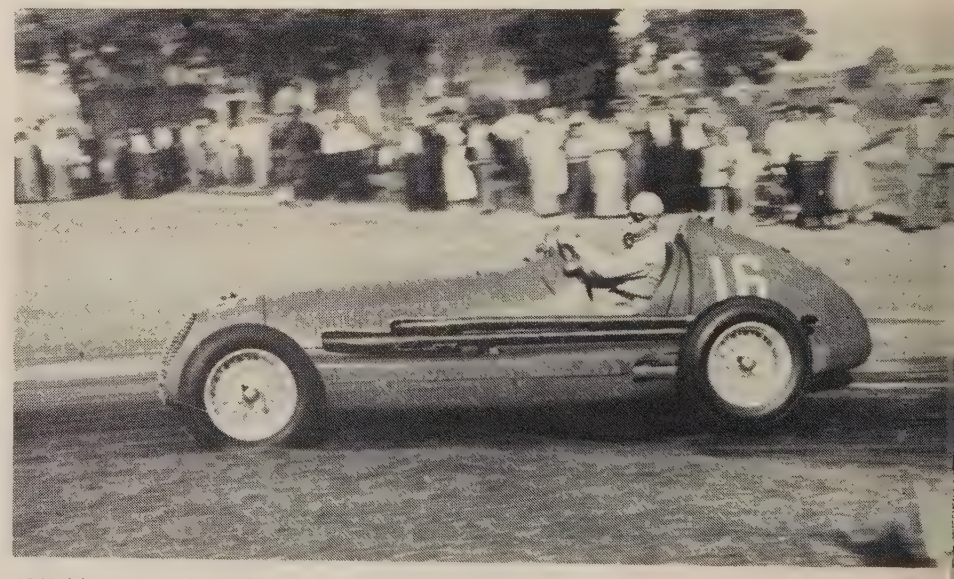
It appears that full scale operations by either Ferrari or Alfa Romeo teams are not expected this season, tho many individual Italian cars will participate.

South America would welcome American participation in these road races in the future, should any suitable cars be available.

The present international crisis has placed improvement of Pan-American relations on the priority list. South Americans love sports and greatly admire the participants. With a single race drawing half-a-million spectators (twice as many as Indianapolis), how could we find a better method of building goodwill and prestige than to have the Stars and Stripes flying at the South American concours to announce the presence of a Grand Prix team from the United States? —Editor

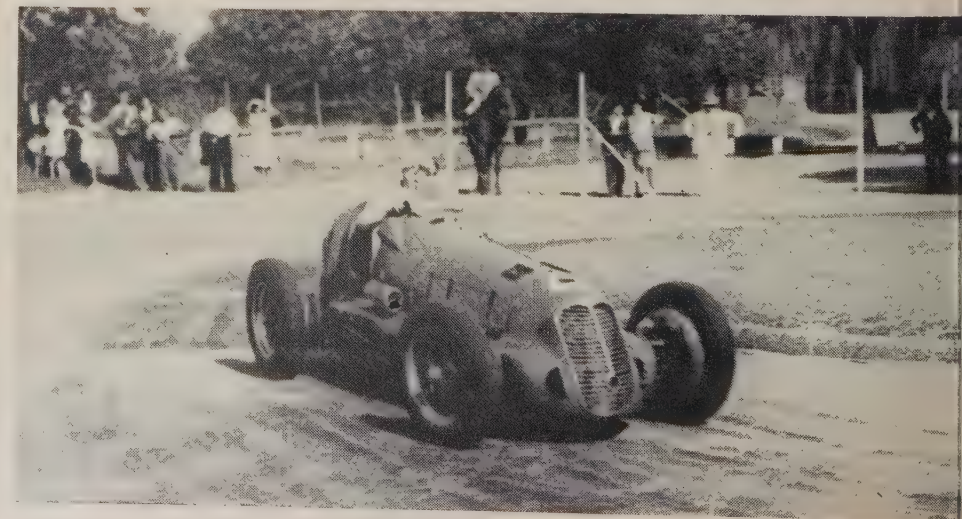


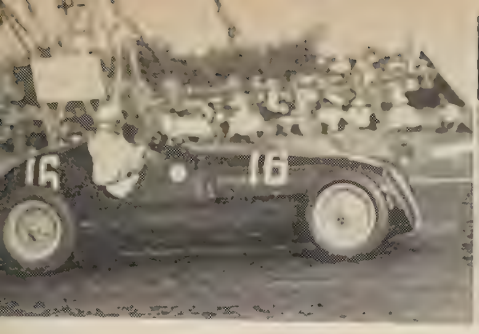
1948 Ferrari 12 cylinder 2 litre



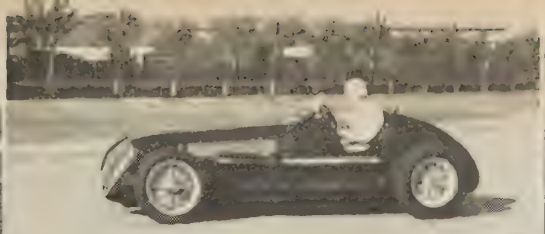
1948 Maserati 8 CL 3 litre Giuseppe Farina

1948 Maserati 1500 cc 2 stage Aldo Ruggeri

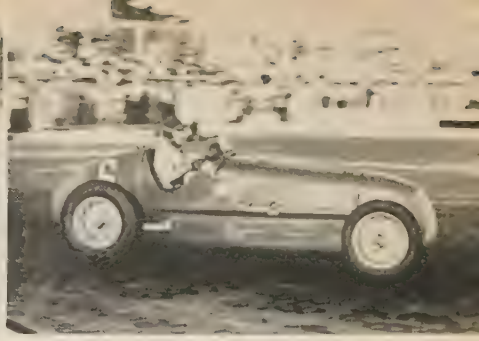




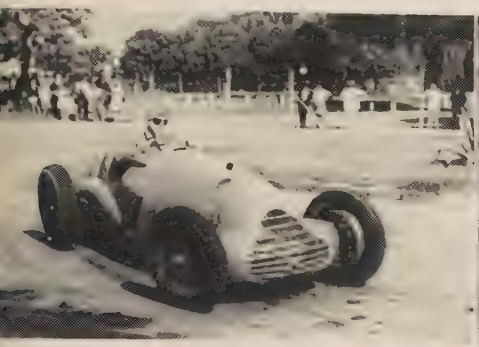
Maserati 4 cylinder 16 valves
Villoresi



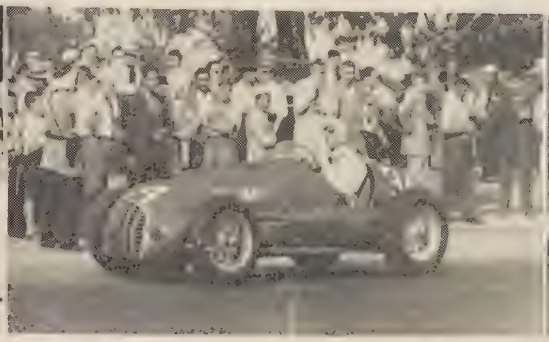
1947 Maserati 4 cylinder 8 valves
Carlo Pintacuda



1947 Maserati 6 cylinder 1500 cc
Gatcomo Palmieri

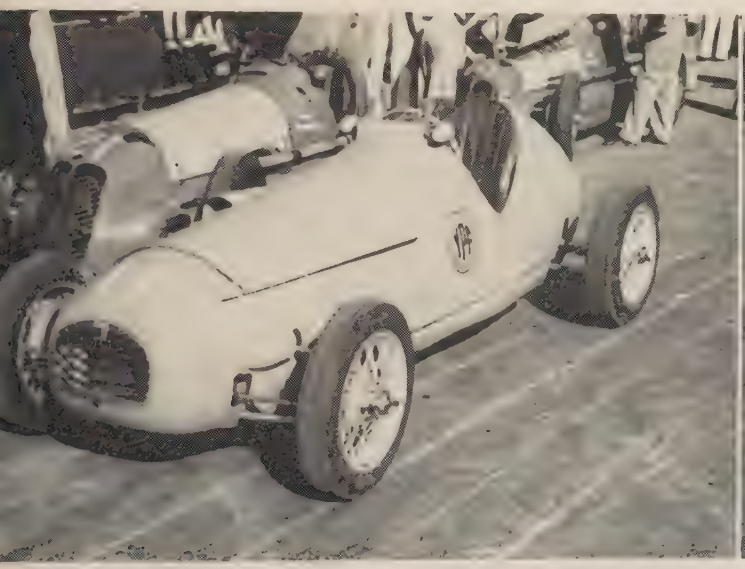


Alfa Romeo 3 litre Type 308
Pierre Wimille



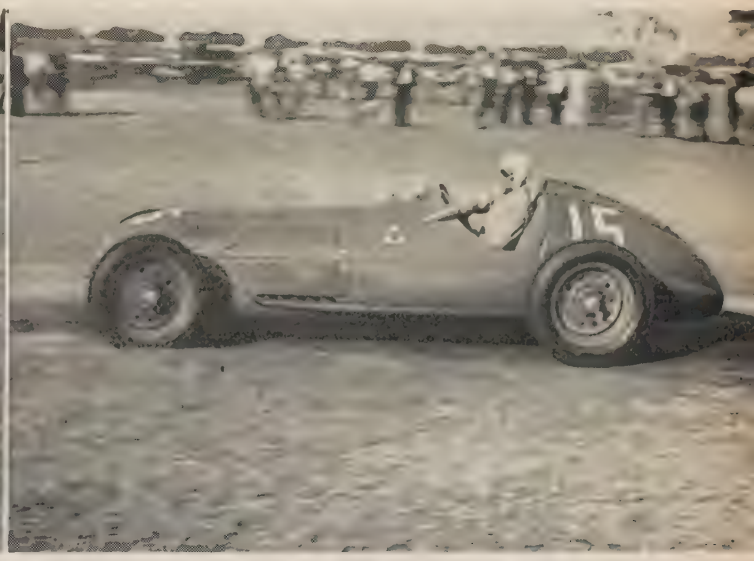
1949 Ferrari 1500 cc single stage
Giuseppe Farina

1950 Talbot 4½ litre "Lago"
Louis Rosier



Simca 1300 cc "Gordini"

Maserati 1750 cc 2 stage



1948 Alfa Romeo 4600 cc 12 cylinder Achille Varzi

1950 Ferrari 2 litre 2 stage Alberto Ascari

Nardi "750" Coupe

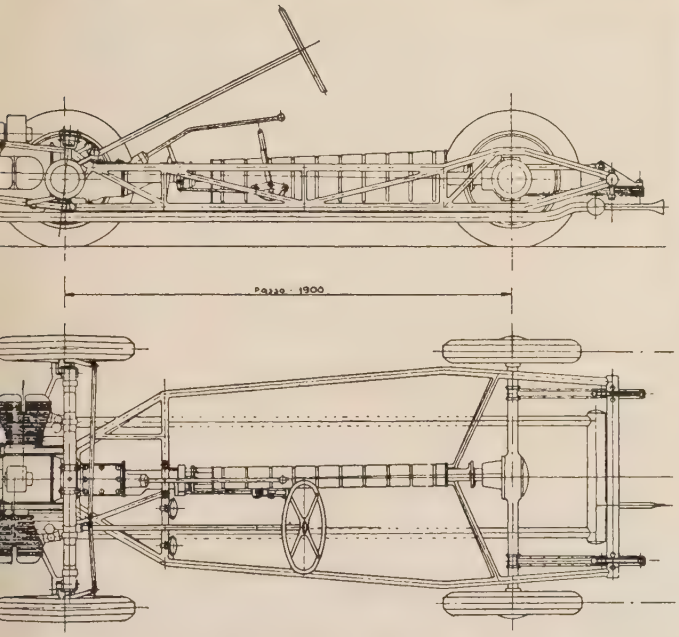
Nardi and Co. is best known in Italy as a manufacturer of two carburetor manifolds for automobile engines. They might be called a "Speed Shop" here in America!

Located in Turin, just a stone's throw from the Lancia factory, they also are engaged in the construction of many special 500 cc and 750 cc sports and racing cars. The "750" Coupe is one of the most recent Nardi products. One of the smallest "hardtops" yet built, it is unusually beautiful when compared to the Fiat, Morris, Crosley, et al. The 2-cylinder horizontal opposed engine is air cooled. It is based on B.M.W. design but is built completely by Nardi. The latest models have the intake port at the front, exhaust at the rear (opposite to B.M.W.). This permits cooler air to enter the carburetor, resulting in greater volumetric efficiency. This cute little coupe is one of the best streamlined designs ever built on a short wheelbase.

Above left, the original series of Nardi 750 cc competition sports car with open bodies.

Left, the latest 750 cc car shown as it won a recent Italian hill climb at Susa-Moncenisio.

Below, the beautiful aerodynamic coupe built on the identical 750 cc tubular Nardi chassis.

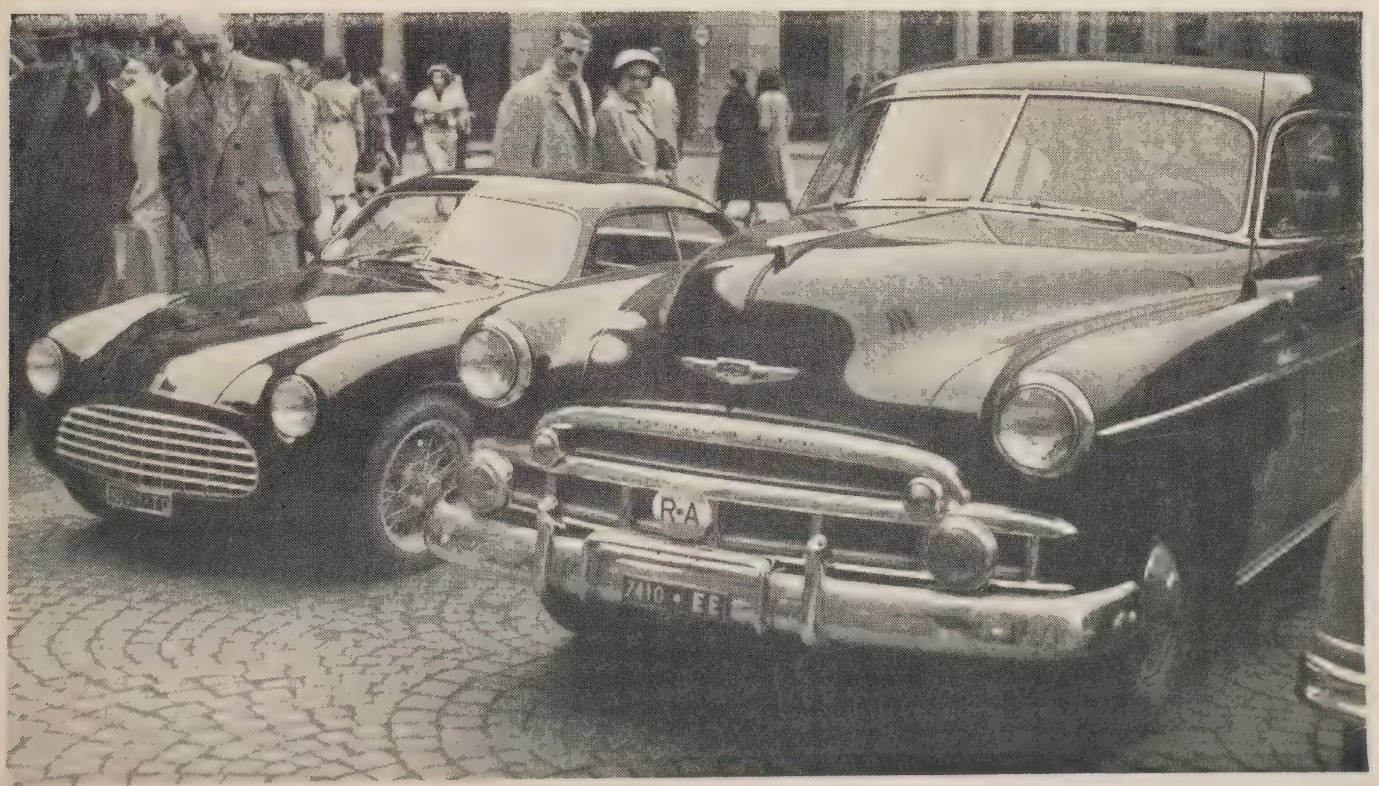


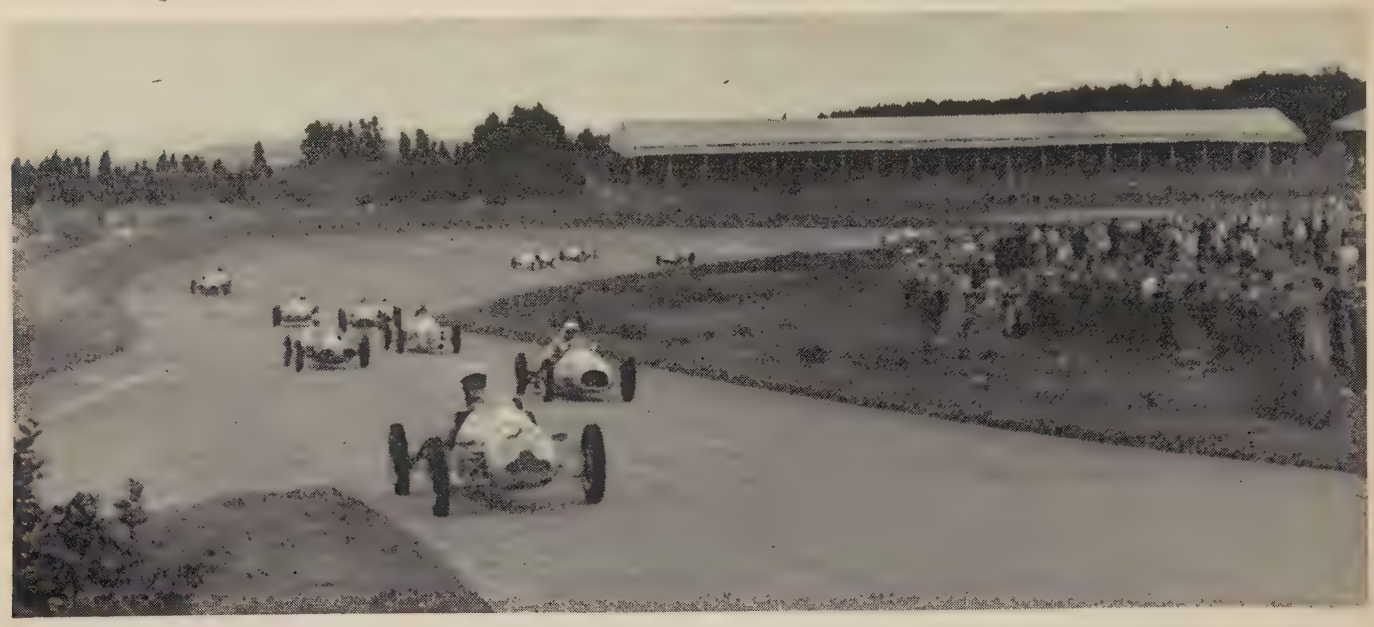
The extreme lowness of the coupe is shown graphically as designer Enrique Nardi stands beside it for comparison. Height is about 48".

Above left, the side view of the coupe compared to a 1949 Chevrolet Fleetline.

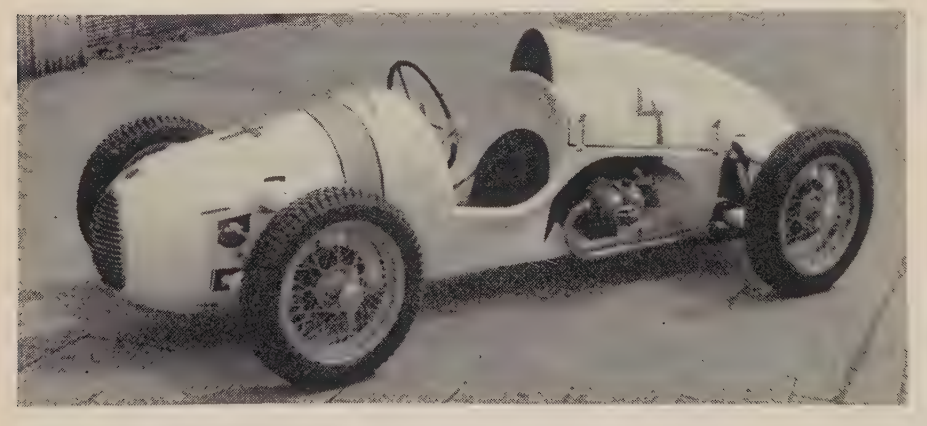
Left, excellent tubular chassis of the Nardi "750" has exceptional rigidity and low weight.

Onlookers are amazed by the small size of the Nardi alongside the Chevrolet, even in Turin, where low, sleek cars are commonplace.





Shortly after the start of the F.3 race at the Nurburgring, Germany. The leading Monopoletta has already passed and is followed by the two Coopers, a French D.B., another Monopoletta, and others. Note the large number of spectators in the grandstands and along the course.



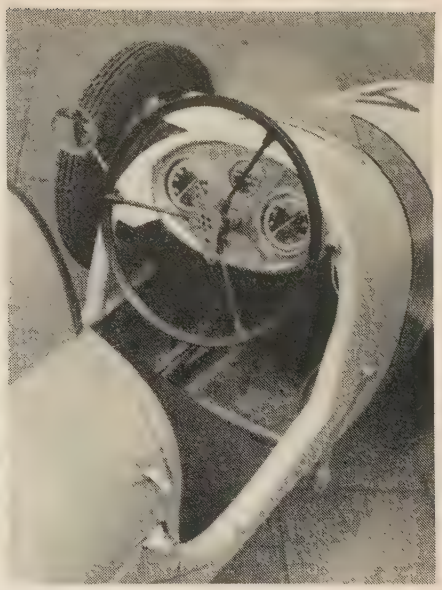
Above, the Monopoletta F.3 race car, showing the location of the two-cylinder BMW engine. The horizontal placement of the cylinders greatly aids in cooling, the major problem with air cooled racing engines. Below, the front suspension of Monopoletta. Note wire wheels.

GERMAN F. 3 "MONOPOLETTA" WINS 2 RACES

The most important German Formula III car, from a design standpoint, is without a doubt the "Monopoletta." It was introduced in the summer of 1950, winning the German Grand Prix hill climb held at Freiburg and the road race at the Nurburgring. These two victories by Monopoletta, with different drivers at two classic races, where, besides the best German Formula III cars, the well known British Coopers participated, are very important. This is shown by foreign orders for 15 cars just received by the builder, Mr. Polensky. The German champion of 2000 cc sport cars before the war, Polensky built in 1946-47 the first Formula II car with a Type 328 BMW engine, rear mounted. With the assistance of Eckhardt, he is now building Formula III cars, creating in just a few months this car, which is one of today's best cars with a 500 cc unblown engine. The BMW motorcycle engine has been chosen as it is best suited for Formula III because of the horizontal placement of cylinders, which makes possible a lower center of gravity and also better cooling of cylinder heads which come laterally out the body. The monocylinders (Norton, J.A.P., etc.) also the vertical twins, (Triumph, DKW, etc.) have very difficult cooling problems because the cylinder itself can't be out of the body as in the BMW. The choice of a motorcycle engine for F.3 (Formula III) cars rather than the 4-cylinder 500 cc automobile engine (as Fiat "Little Mouse"), is because of its lower weight, being air cooled.

The Monopoletta engine develops 45 hp at 7500 rpm. The weight of the complete car is 584 pounds. Top speed is 99 mph. The front grille is just for esthetic looks. Even for climbing races this "F.3" car is very much superior because of its power/weight ratio of 13 lb./hp, which is very low for a car of that type. For a comparison

At right, the rear suspension of the Monopoletta "500". The heavy duty shock absorber and suspension arms are arranged similarly to the British Cooper. The cockpit of the Monopoletta is neatly arranged, with the steering wheel removable for easy entry and exit from the car. A "knock-off" hub holds the wheel on a splined shaft, for quick removal.

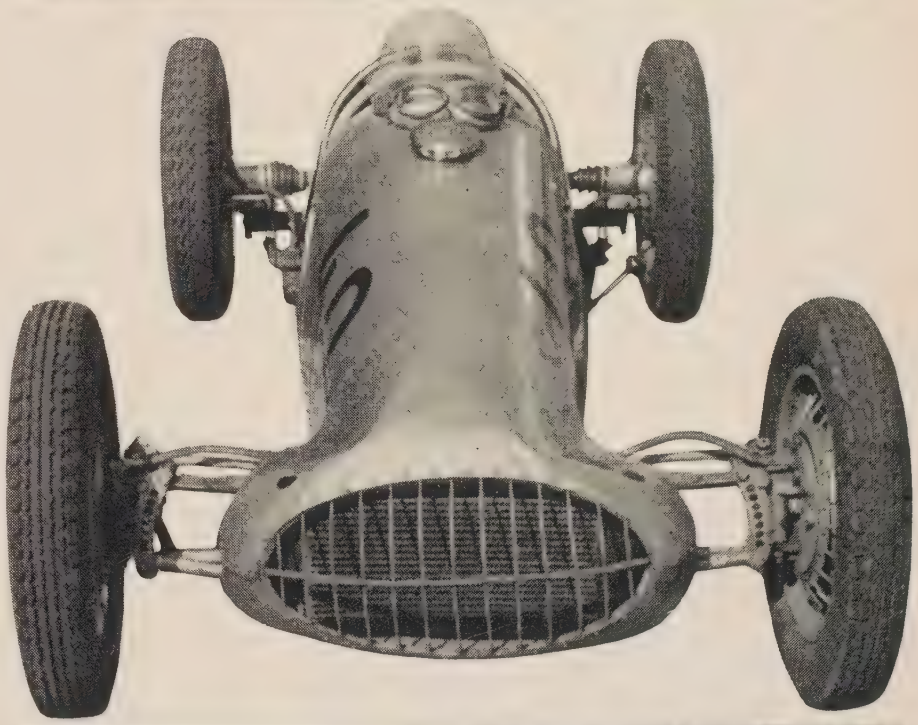


we like to point out that at Freiburg Hill climb, the average speed by Pietsch, the winner, on a blown Maserati-Milan car, G.P. formula I, was 54 mph, while the Monopoletta made the same 7.5-mile race at 47 mph. The Monopoletta final drive isn't like many F.3 cars (which use a chain), but by drive shaft, differential and cardan shafts. The front and rear suspension, with large telescopic shock absorbers, is by transverse leaf spring above, and oscillating arms placed below. Both the spring and the arms are covered with sheet metal fairings. Fuel tank capacity: 10.5 gallons. Wire spoke wheels have Rudge hubs and Borrani special light alloy rims. The wheelbase is 76¾ inches and the track 47¼.

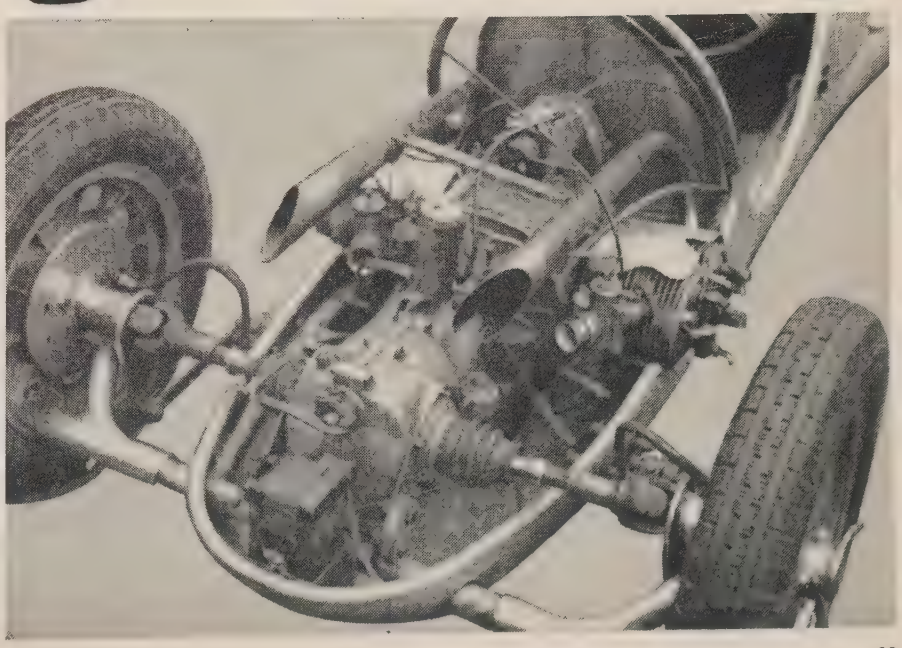
Another interesting F.3 car is the "Scampolo," the first German car built specifically for this category; its latest models have the BMW two-cylinder engine instead of the DKW vertical two-cylinder, two-cycle, water cooled unit. The power/weight ratio is theoretically close to the Monopoletta's, but the Scampolo is inferior in speed and acceleration. The photos show that it is a smaller car than Monopoletta. Until June 1950, Scampolo was considered the best German F.3 car.

Meanwhile, the races for F.3 cars are becoming very numerous in Europe, and even in Italy now they are building several models of monoposto cars with unblown 500 cc engine. So the 1951 F.3 races will see: British, French, German, Dutch, Swiss and Italian cars. The most important thing about these cars is the low price; consequently, we see an increasing number of cars in each succeeding race. This results in a better balance of power, also gives a better show to the spectators, who are guessing all the time till the end about the winner. Naturally it will be a very good idea if the race organizers will choose short tracks with short stretches and many curves. In fact, while this kind of car doesn't mean much to those who like the G.P. "F.1" cars at 90-100 mph and better, the easy driving of F.3 cars, which enables them to take the curves at high speed, is the feature of these cars which most people will enjoy.

—CORRADO MILLANTA



Road and Track is attempting to bring together all 500 cc enthusiasts in the U.S. Inquiries are being grouped according to geographical location, and a listing of those interested will be compiled. If you wish to be included on this list, notify us immediately: 500 CLUB, Road & Track, Box 110, Glendale, California.



Above, center, the Scampolo F.3 car, as first designed, with water cooled DKW two-cycle engine. The radiator is located in the front.

At right, the BMW installation now used in the Scampolo. Note the de Dion type rear suspension, and integral differential-gearbox unit.

HOW TO DRIVE

(Continued from page 15)

Next time around, still assuming Bonzo, who never assumed anything but his clothes, try "correcting" that first slide a bit more gently. What? You just thudded into the hay-bales backwards and bent your lovely car?

Why do you think we call it a 25 mph corner?

At this point one of you jumps up and says: "Fine, fine, but what about numerous experienced drivers who assume the "AAA stance" *before* they reach the corner, who scream around in that attitude, and straighten out on the following straight, going twice as fast as us?" All in good time, gentlemen, and this is it. If you do just that, you will gain. Remember though, the G.P. drivers apparently don't think it's worth the effort on really *slow* corners. They save that stuff for the faster ones, which we are about to approach.

In order to get the car into a "drift" *before* the corner, it is only necessary to be going a bit too fast, and to urge the steering wheel over so that if you kept perfect traction, you would mount the inside curb. Actually, you will experience the unnerving sight of say, a tree, about twenty feet this side of, and on the inside of the corner, exactly lined up with your radiator cap, while you are travelling at speed. But you will find that your *direction* of travel will (for a while) be perfectly straight down the road, the *attitude* of your carriage having very little to do with it.

Now, to *keep* the car in the "drift," you should apply throttle, with a delicacy most often reserved for "footy-footy" under the tavern table. Then as the point in the corner where the centrifugal force reaches its peak is *nearly* on you, (this point is called the "apex" of the corner) start pouring on the coal and delicately "correcting" with the steering wheel, by turning it in the *opposite direction.*

Try, sitting in your chair, the arm and leg motions called for. As you pantomime these, the rhythm of it will make all this a lot easier to understand. A word of warning, however: In order to get away with this sort of thing, you have to be *right.* You have to *know* your cut-out point, you have to know *precisely* how much to turn the wheel, inward, the first time, in order to set the drift. Bear in mind that the *amount* you turn the wheel, and the *rate* at which you turn it, both affect the result. A jerky *little* twist can throw you into that long, long slide. A slow, large turning of the steering wheel can (ha! ha!) have the same effect. But it is true that one complements the other; if you are jerky, don't turn the wheel as far as if you are lazy, but the best way is turn it just the right amount, smoooothly.

Now, once the drift is set, you better be coming right in with the next step as promptly as an actor answers his cue and that is meant to mean so promptly that it is almost an interruption.

The Next Step

Usually the next step is a reversal of the steering-wheel turning, still frightfully smoothly, the only guide being that it is usually a bit less than you turned it to set the drift (unless your car is a floppy-limbed dog, and there are plenty of such). Then, *exactly* the right *progression* of throttle-opening must follow, nicely timed so it is wide open just at the "apex" of the corner, with further correction as you get into the next straight, to keep things quiet. It *does* take skill.

It is well here to add that stock American steering gear ratios are so low, meaning that you have to turn the wheel so much to get any answer from the road, that this sort of thing is highly dangerous in such a car. In addition, the soft springing, tires, etc., the bad seating position and the glorious sound-proofing, will make you feel like a man on the moon, trying to race by remote control, without feel or even prompt response. This is why the Sports Car Club of America, for instance, frowns on stock cars in road races. Once they get into trouble it is very nearly impossible for a novice to straighten them out.

But if you are driving a car with good balance, no steering-wheel play (*none*!) a high "rate" steering, meaning you get a lot of front-wheel motion for relatively little wheel winding, a car with a good seating position from which you will not be flung loose, good visibility and (not the least) a *perfect* accelerator *linkage*, light yet *without* lost motion, and a steady throttle-foot, you can actually "feel" the car's attitude and you will almost instinctively "know" what to do. If the turn is a fast one, remember to do *everything* sooner and more, than seems proper, to *you.* There was never a better axiom for road racing corners, than "too little, too late, spells disaster." The reason is that if you consistently cut the wheel and apply the juice, just a *little* more than is proper, you can always control the effects (given a safe car) by correction with the wheel, coordinated with relaxing of the throttle-foot. But if you are sluggish, and do everything too timidly and too late, you are going to be in bad trouble.

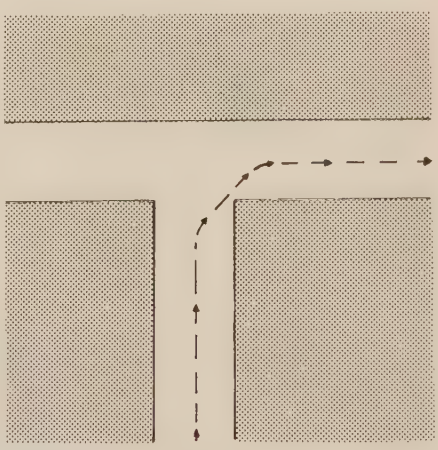


Figure 3

The best rule is to creep up on this "power-sliding" by degrees, in which way you will develop the necessary delicacy of touch, for at a speed just barely fast enough to induce the weeniest amount of drift, you can't horse around with either wheel or foot without charging straight off the inside of the road. We are going on the theory that you are alert and have the benefit of sight and hearing, as well as elementary sense of balance, all of which faculties will fortunately conspire to make you "afraid" to try any obviously asinine manoeuvres. That "fear" is not to be put away ruthlessly. It is your own common sense telling you that if you attempt to jump from the top to the bottom of a flight of stairs in one step, you will fall on your head.

Another good way to become familiar with power-sliding, is to seek out a loose gravel or dirt surface, where you can get all the effects at one-half speed. Snow is also good, providing it is smooth, and underlain with a good hard surface. Unfortunately, such places are all public highways. Ice is to be deprecated. The co-efficient of friction is *so* low that it is largely a waste of time.

By the time you become so adept at power-sliding that you might be called a "maestro," you are ready to consider the effect which bumps have on your art. The effect is, frankly, disastrous. The car steers so inefficiently when one or both front wheels are airborne, that bumps, particularly on fast bends, can be terribly serious hazards. Not only is displacement of the front wheels in effect, but the dynamic balance of the entire machine can be upset, and that power-slide, brother, is pure dynamic balancing!

Also beware of an "off-camber." Camber is the roundness of the surface of a road, which is designed that way so the rain will roll off it and not sit there eroding potholes. The inside of most turns then, slopes to the inside and the outside, slopes to the outside. You want to get on the inside, and as nearly as posible, stay there. However, if you are using the entire width of the road, as you may, you must reckon on more instability as you come out of a highly cambered bend, than you had in the middle. Fortunately, the apex, where you will have to bear the greatest "outward urge," is where you are trying to cut as closely to the inside as possible, again in an effort to keep the machine stable.

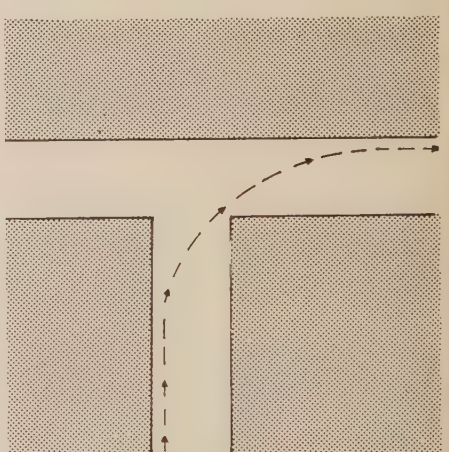


Figure 4

Thus we are brought to positioning, for a simple right-hand ninety-degree corner. Note the diagrams. Fig. 3 is wrong, and Fig. 4 correct, not because you are saving distance, laudable as this may be, but because you are trying to keep the centrifugal force *down* (or at least have it build up *smoothly* so the tires can retain their rapidly weakening grip to the uttermost). Those abrupt changes of direction in Fig. 3 will each induce an immediate skid, which would have to be corrected with opposite helm and power, and the entire effect would be to make you waste time. Of course if you wrench the wheel and do nothing else, you will spin. Note the somewhat less abrupt change of direction in Fig. 4, whereby the "drift" is set, after which you want to keep everything as smooth as possible.

Finally, it must be admitted that the above is only the Primer on cornering. If you use this much instruction you will have the basis of knowledge on which to build, thru experience, a more advanced technique. From here, experience is the best teacher.

---

* Outside Air Temperature
** Escape Road

PHOTOGRAPHY

EXPOSURE PROBLEMS

Conducted by Karl A. Barleben

One of the very first facts the budding photographer must learn in relation to exposure problems is this . . . the light we see by is not entirely the same as that which affects the photographic film! To be specific, ultra-violet light, which is invisible to the human eye, is the light which most strongly affects the photographic film. It is, therefore, easy to appreciate how wrong human judgment of photographic light values can be, and why a reliable exposure meter should be regarded as a necessary part of the photographic equipment.

Fortunately, all films have what is termed "latitude" . . . the ability to automatically compensate for variations in over- and under-exposure. Were it not for this happy faculty, photography as we know it today would certainly not be the relatively easy thing it is. Professional photographers with years of experience behind them like to pride themselves on their ability to do without exposure meters. Up to a point they are quite successful, it is true; nevertheless, let's face it . . . were it not for the rather wide range of latitude in black-and-white films, they would be more often wrong than right in evaluating photographic exposure merely by judgment.

Correct exposure takes into consideration various factors, among them being (1) the brilliance of the existing light, (2) speed (or sensitivity) of the film in the camera, (3) shutter speed being used, and (4) lens diaphragm opening being used. Not infrequently we must of necessity choose a fast shutter speed . . . to freeze fast action, such as at the races . . . in which case the lens diaphragm must be proportionately opened to compensate for the light loss created by the fast shutter speed. On other occasions, the lens diaphragm must be closed down in the interest of gaining additional depth of focus. In this case, a slow shutter speed must be used in order that the correct exposure value be preserved.

Practically all exposure meters made in the United States now use A.S.A. (American Standards Association) film speed values, and this system should, for the sake of uniformity, be used by all photographers. Each film is assigned a specific value which refers to its speed or sensitivity to light, and obviously the exposure meter must be adjusted for this speed before a correct exposure reading can be made. This information is provided with all films and exposure meters.

The most popular meters are of the electric cell type . . . that is, they incorporate a cell which is sensitized to light and which is connected electrically to a dial which gives direct readings in either photographic values and/or foot-candles. Such meters are entirely automatic in their operation and require no batteries since the cell is energized by the light senistive coating. In short, the cell converts iight energy into electrical energy.

Another meter is the "extinction type," which depends upon a strip having graduated amount of translucence and visual interpretation of it. Such meters are naturally less costly and, if intelligently employed, can be almost as accurate as the electric type.

A third type of "meter" is the calculator type; a simple card with several rotating dials on it, which is consulted after setting for the correct light condition and film speed. Calculators of this type are usually priced at only a quarter, and those made by Eastman Kodak are excellent as well as completely reliable.

It must be realized that correct exposure is mandatory if good photographs are desired. True, it is possible to reduce over-exposed negatives, but these corrective processes are extremely limited in their scope and can never hope to bring a poorly exposed negative to the quality and value of one which was exposed correctly to begin with.

An electric meter is rather delicate and should not be abused. Avoid direct sunlight, heat and humidity, and provide a suitable protective case for it.

Color photography makes the use of a reliable exposure meter more necessary than for black-and-white film, since color film has a very limited latitude. Also, color film is more expensive, and it is indeed discouraging to get poor shots in color which are fit only to be discarded.

The cost of a good meter is not at all excessive when you consider that (1) it will give faithful service indefinitely if properly cared for, and (2) it will save a lot of money over a period of time by making each exposure, color or black-and-white, count and avoiding poor results. Since many of the shots the average car enthusiast is interested in are of subjects which can never be duplicated . . . such as races and trial runs . . . it is worth every effort and expense to assure perfect results the first time.

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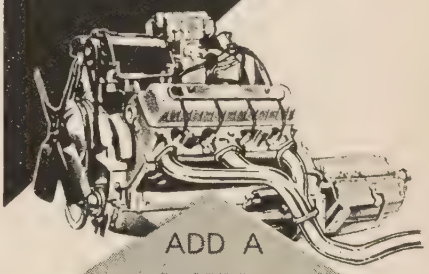
FOR 1949-1950 OLDSMOBILE 88 and 98



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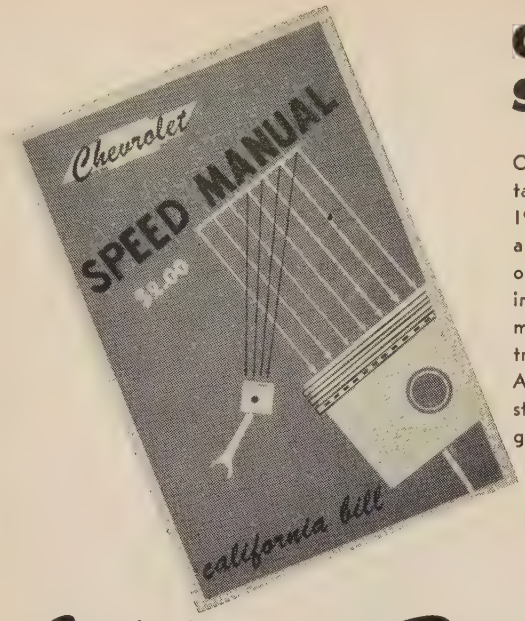

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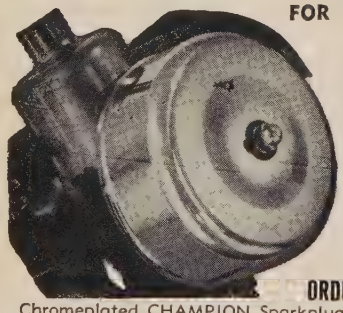

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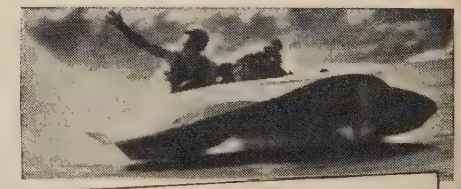

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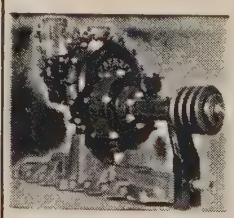

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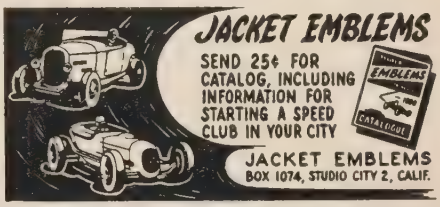
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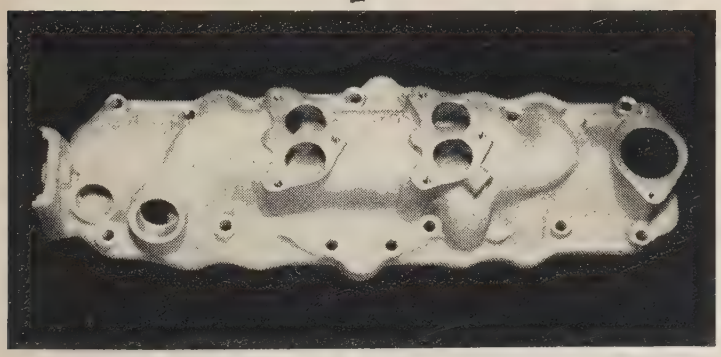

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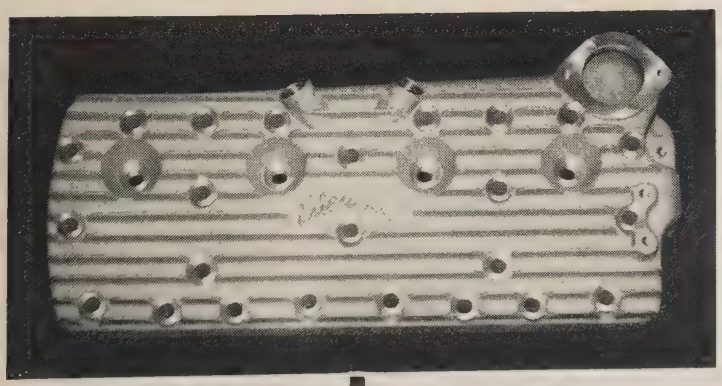

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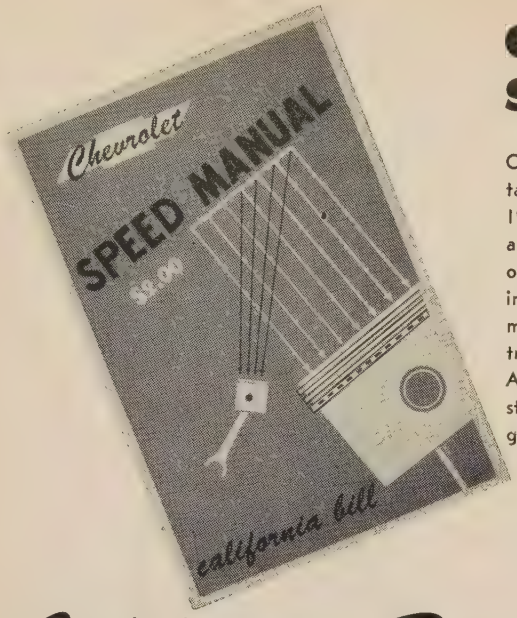

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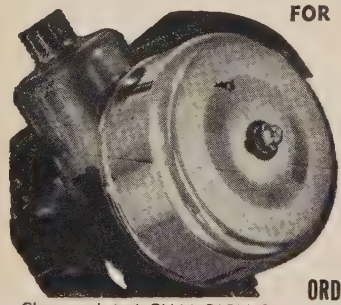

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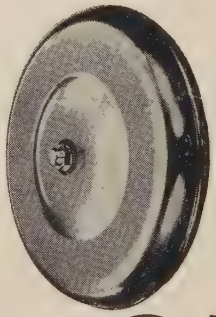

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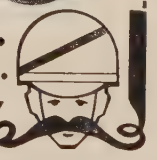

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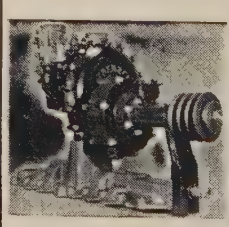

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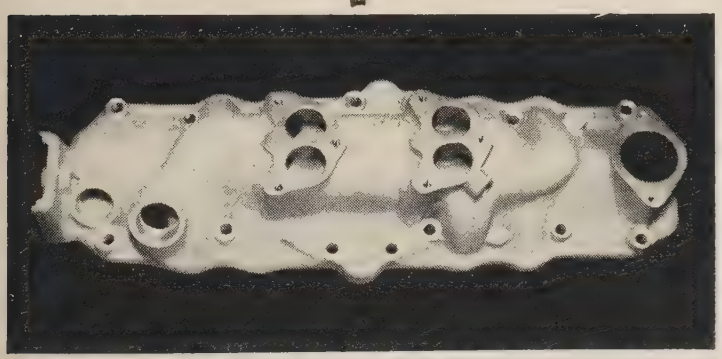

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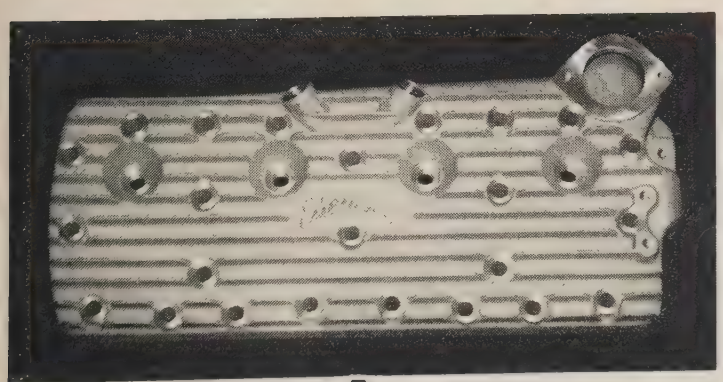

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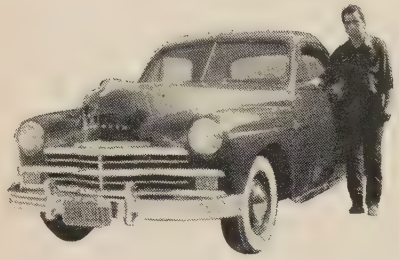

Tom Ruddy's 1949 Plymouth is another typical example of what can be done with a minimum of equipment and expense.

This car is entirely stock except for an ENGLE ¾ cam, milled head and an Edmunds dual intake manifold.

Performance data

- ▼ Idle—smooth and quiet at 450 rpm
- ▼ Acceleration—0 to 60 mph in 11.0 sec. Ran thru Santa Ana Course at 78.85 mph.
- ▼ Top speed — 103 mph Russetta Timing
- ▼▼ All tests were run on gasoline

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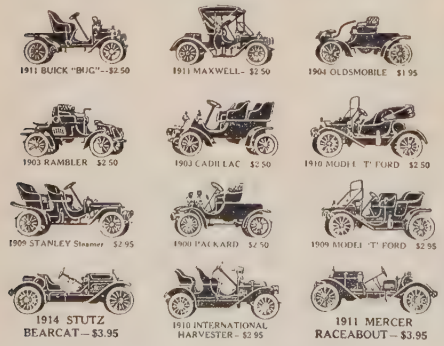

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285 HP GMC ENGINE! . . .

(Continued from page 9)

assembly has advantages for racing, but the standard GMC arrangement can be used if desired. Likewise, the injector carburetors can be replaced with a special manifold which permits use of two 2-inch Riley carburetors, or two Vacturi units of the same size. Both the Riley and the Vacturi are side draft units and Horning reworks the latter for floatless operation.

For those interested, the heads are very carefully designed for freedom from hot spots and distortion. There are six inlet and six exhaust ports situated on opposite sides of the head. Intake valves have a diameter of 1⅞ inches, exhausts 1⅝. The valve lift of the standard reground cam for use with roller tappets is .437 inches and the timing inlet opening is 30° BTDC, closes 67° ABDC, exhaust opening 67° BBDC and closes 26° ATDC. This timing is with .015 lash, and in actual operation Horning recommends .001-.002 lash. Special tubular pushrods and dual valve springs are used. Horning makes his own pistons which are flat-topped permanent mold Lo-Ex castings, free from stress raising ribs, in accordance with the best and latest designs developed for aircraft.

What is done to the "bottom end"? With one exception, absolutely nothing! The exception is a shallow groove turned in the middle of each main bearing journal of the crankshaft to give a higher rate of oil flow to the con rod bearings. This does not reduce main bearing area because these grooves line up with similar ones already incorporated in the I.D. of the stock main bearing inserts.

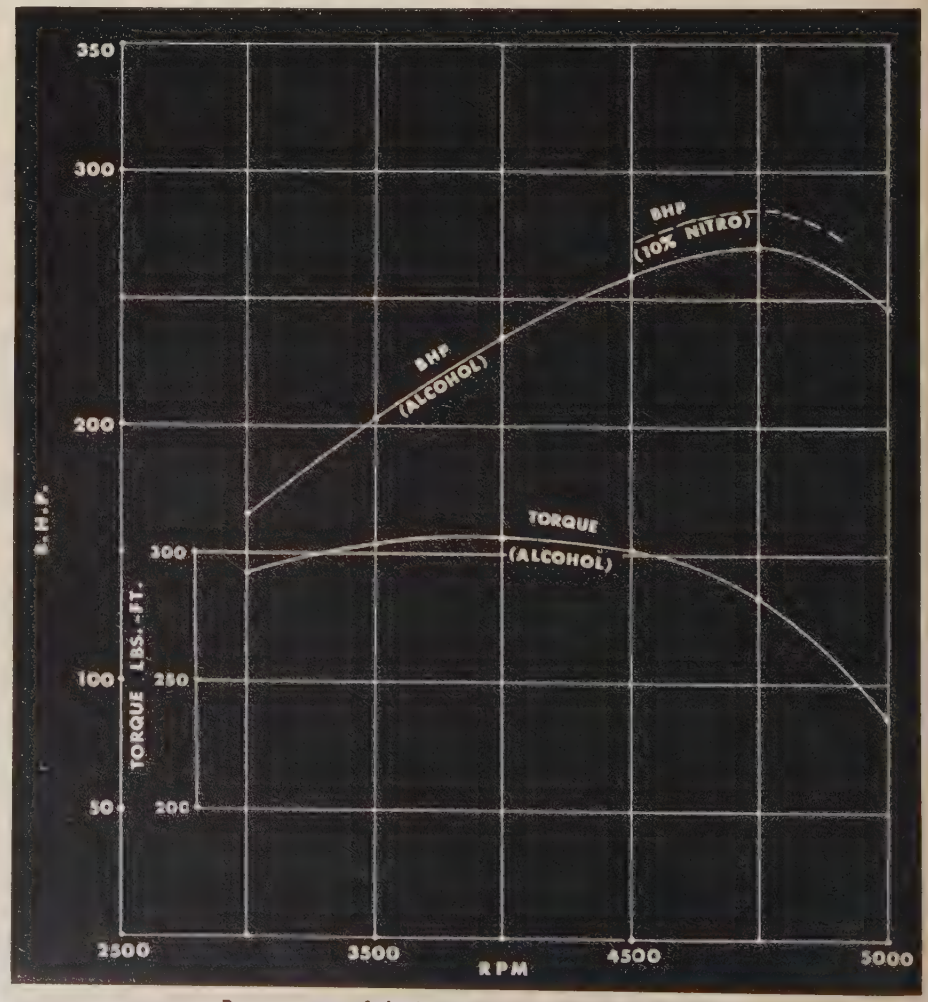
HORNING RACING ENGINE SPECIFICATIONS

General

"Short"block assy.	G.M.C.
Cyl. head	Horning—12 ports
Bore sizes	3 9/16 to 4
Stroke	3 13/16 or 4
Displacement range	228 to 301 cu. in.
Carburetion	6 injector type or 2 Rileys or 2 Vacturis
Lubrication	wet sump or dry sump
Ignition	stock distributor or 2 coil distributor or magnetos
Tappets	roller
Weight-less flywheel	475 lbs. (approx.)

Horning "274"

Bore		3 29/32 inches
Stroke		3 13/16 inches
Displacement		274.1 cu. in.
Max. bhp		285 at 5000
Max. torque		307 lbs. ft at 4000
Max. bmep		169 psi
Comp. Ratio		12.5 to 1
Fuel		methanol + 10% nitro-methane
Carburetion		6 injector type
Exhaust		dual, no mufflers
Lubrication		dry sump
Tappets		roller
Pushrods		tubular
Valve lift		.437
Valve timing	IO	30° early
	IC	67° late
	EO	67° early
	EC	26° late



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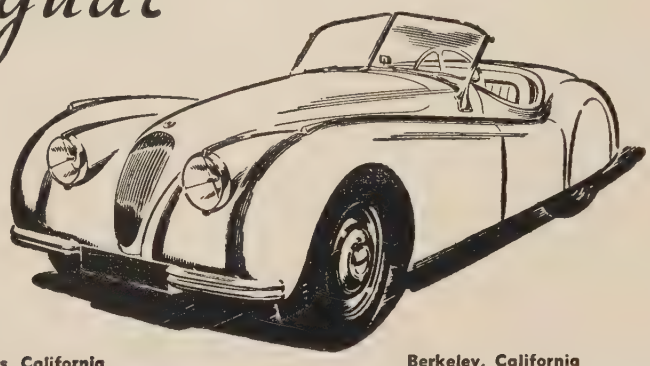

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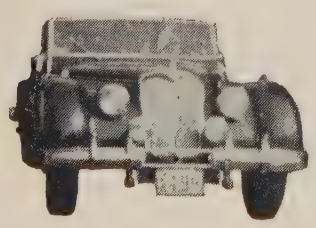

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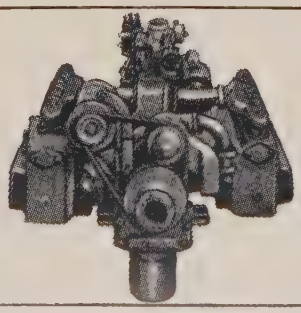

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BOOK REVIEWS

Treasury of Early American Automobiles
by Floyd Clymer — McGraw-Hill $5.00

Mr. Clymer, himself, gives an excellent thumb-nail description of this book in the preface when he says, "This book is meant to be neither an analytical study nor a definitive history of the American Automobile."

Within this framework the book is excellent, being both amusing and enlightening, tho I found it exasperating that such noble names as Kissel, Lozier, Stutz, Locomobile, and others were dismissed with only a single paragraph. Most of the charm and interest of this "Treasury" comes from the many photographs and reproductions of old advertisements of cars and accessories long forgotten.

Similar in content to smaller books published earlier by himself, this latest effort of Mr. Clymer benefits greatly by the superior quality of paper, printing and jacketing made possible by the resources and facilities of McGraw-Hill, the publishers.

The list of 2200 makes of cars once manufactured in the U. S. is an interesting part of this book and will be equally useful for settling or starting arguments!

—ROGER BARLOW

Floyd Clymer's Book of the MEXICAN ROAD RACE
by Roland Goodman — Clymer—$2.00

Here for the first time, we have a really comprehensive and overall picture of that most intriguing event held so near and yet so far from the eyes of the U. S. motoring enthusiast.

This book more than makes up for the virtually non-existent news service coverage of the race at the time of its running, and the naturally sketchy stories brought back by the individual competitors who, of course, saw very little of the overall race itself.

Floyd Clymer has presented us not only with an excellent set of photographs and a clear account of the day's racing on each section of the 2174-mile event, but also includes the history of the event, the regulations, protest, etc., as well as short accounts by some of the drivers, such as Bud Sennett, Jack McAfee, Piero Taruffi and the winner—Hershel McGriff.

Those enthusiasts who were disappointed in the apparent poor performance of the European entries will have a different view of matters after reading this book—altho the writers certainly had no bias in favor of the "foreign" entries; far from it.

An interesting chart is included by the author, showing that had a new race been started at Mexico City for the second half of the course, the winners would have been as follows:

1st Alfa Romeo (by 10 minutes)
2nd Oldsmobile
3rd Alfa Romeo
4th Delahaye

Proponents of both American and European cars can find plenty of cause for pride in their favorite product for this was an incredibly tough event for both car and driver; and a two-dollar investment with Mr. Clymer will provide you with some of the best vicarious racing to be experienced —be you Alfa man or Cadillac man. Certainly no motoring library is complete without the "Book of the MEXICAN ROAD RACE."

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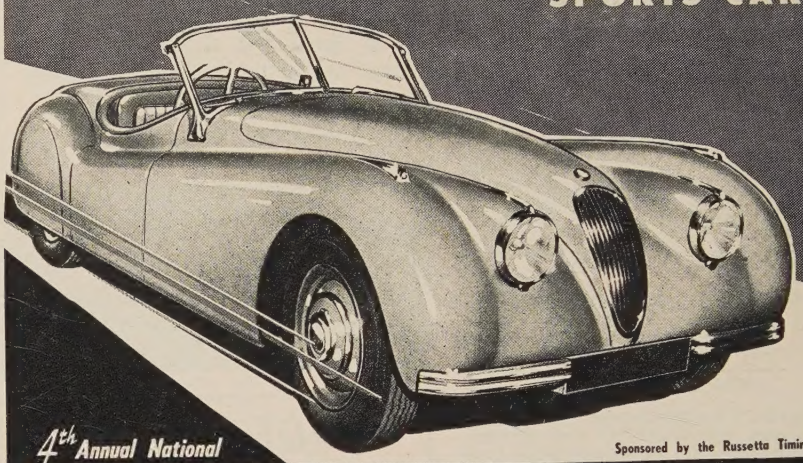

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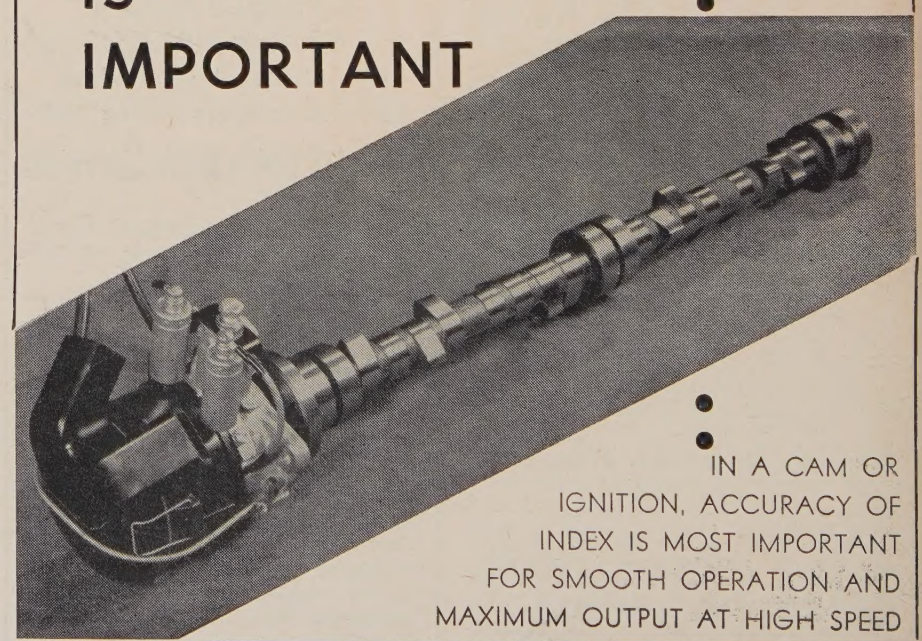

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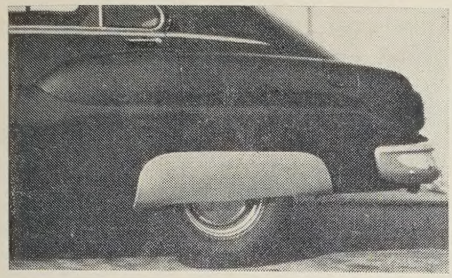

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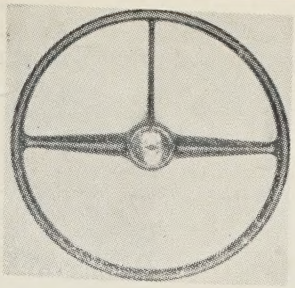

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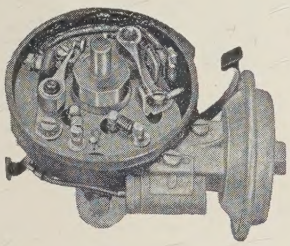

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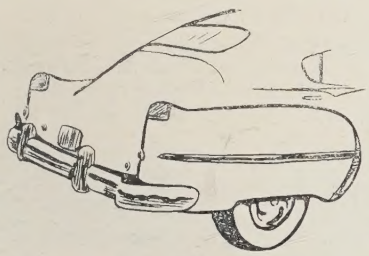

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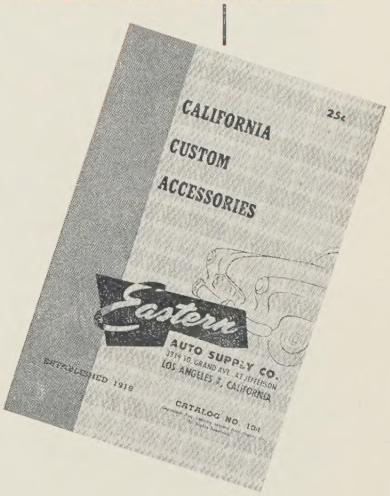

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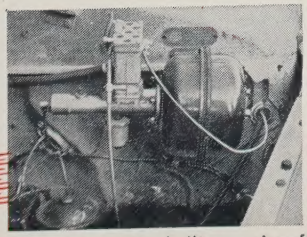

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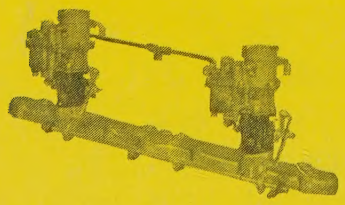

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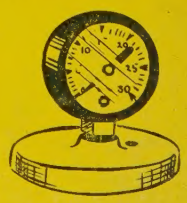

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